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Part III

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International Trade Administration

Revision of Commodity Control List, and Amendment To Export Administration Regulations To Conform to Revised Commodity Control List; Interim Rules With Request for Comments

DEPARTMENT OF COMMERCE

International Trade Administration

15 CFR Parts 385 and 399

Revision of the Commodity Control List

AGENCY: Office of Export Administration, International Trade Administration, U.S. Department of Commerce.

ACTION: Interim Rule with Request for Comments.

SUMMARY: This revision is undertaken to: conform the export controls imposed by the U.S. Government with the controls established during multilateral negotiations with our COCOM partners (International Coordinating Committee); identify controls for the newly established Country Group P (People's Republic of China); eliminate previously existing errors included in listings of unilaterally controlled commodities; modify controls applicable to selected unilaterally controlled commodities; identify reasons for control of all commodities included in the Commodity Control List; and simplify the Commodity Control List.

DATES: The changes announced herein are effective June 25, 1980. This rule may be further revised in light of any comments received. Comments must be received by the Department before noon, August 25, 1980.

ADDRESS: Written comments (six copies when possible) should be sent to: Richard J. Isadore, CCL, Acting Director, Operations Division, Office of Export administration, U.S. Department of Commerce, P.O. Box 7138, Ben Franklin Station, Washington, D.C. 20044.

FOR FURTHER INFORMATION CONTACT: Archie Andrews, Director, Exporters' Services Staff, Office of Export Administration, Telephone: (202) 377–5247 or 377–4811.

SUPPLEMENTARY INFORMATION:

Rulemaking Requirements

Section 13(a) of the Export Administration Act of 1979 (Pub. L. 96–72, to be codified at 50 U.S.C. App. 2401 *et seq.*) ("the Act") exempts regulations promulgated under the Act from the public participation in rulemaking procedures of the Administrative Procedure Act. Because they relate to a foreign affairs function of the United States, it has been determined that these regulations are not subject to Department of Commerce Administrative Order 218–7 (44 FR 2082, January 9, 1979) and International Trade Administration Administrative Instruction 1–6 (44 FR 2093, January 9, 1979) which implement Executive Order 12044 (43 FR 12661, March 23, 1978), "Improving Government Regulations."

However, because of the importance of the issues raised by these regulations and the intent of Congress set forth in section 13(b) of the Act, these regulations are issued in interim form and comments will be considered in developing final regulations.

The period for submission of comments will close August 25, 1980. No comments received after the close of the comment period will be accepted or considered by the Department in the development of final regulations. Public comments which are accompanied by a request that part or all of the material be treated confidentially because of its business proprietary nature or for any other reason, will not be accepted. Such comments and materials will be returned to the submitter and will not be considered in the development of the final regulations.

All public comments on these regulations will be a matter of public record and will be available for public inspection and copying. In the interest of accuracy and completeness, comments in written form are preferred. If oral comments are received, they must be followed by written memoranda which will also be a matter of public record and will be available for public review and copying. Communications from agencies of the United States Government or foreign governments will not be made available for public inspection.

The public record concerning these regulations will be maintained in the International Trade Administration Freedom of Information Records Inspection Facility, Room 3012, U.S. Department of Commerce, 14th street and Constitution Avenue, N.W., Washington, D.C. 20230. Records in this facility, including written public comments and memoranda summarizing the substance of oral communications, may be inspected and copied in accordance with regulations published in Part 4 of Title 15 of the *Code of Federal Regulations*. Information about the inspection and copying of records at the facility may be obtained from Mrs. Patricia L. Mann, the International Trade Administration Freedom of Information Officer, at the above address or by calling (202) 377–3031.

Regulatory Changes

The format of the Commodity Control List (CCL) has been simplified as follows:

- The GLV dollar value limits for Country Groups T and V are consolidated into one column.
- The "GLV dollar value limit" column for Country Group Q (Romania) is deleted, and GLV dollar value limits for this group are indicated by footnote. Where there is no footnote, the GLV dollar value limit for Romania is 0.
- A new column is added to indicate the "Reason for Control" as required by sections 5(c) and 6(k) of the Export Administration Act of 1979.
- The sub-group headings are deleted, and the entries are placed in numerical order (disregarding the initial digit) within each group.
- The "Processing Code" column is moved to the right side of the page, so that divisions of responsibility for licensing a particular commodity may be indicated when necessary.
- Cross-references are inserted in place of deleted entries to aid CCL users in locating appropriate new entries. These cross-references will be retained until the next full revision of the Regulations.

In addition to the format changes described above, changes in the CCL and the Advisory Notes (included in Supplement Number 1 to Part 385) resulting from unilateral and multilateral reviews have also been made. These changes relate to national security controls imposed under the authority of section 5 of the Export Administration Act of 1979. The changes in the CCL resulting from these reviews are outlined below.

In most instances, foreign availability of items subject to increased control as a result of the multilateral review was found to exist only in the countries that cooperate with the U.S. in the multilateral control program. Thus, multilateral agreement on a new international control list has effectively eliminated foreign availability.

A few of the items also were found to be available from nations that do not participate in the multilateral control program. In these cases, pursuant to sections 4(c) and 5(f) of the Act, it has been determined that notwithstanding some degree of foreign availability, adequate evidence was available to demonstrate that the absence of controls would prove detrimental to the national security of the United States. Active efforts are under way to negotiate the elimination of such availability as required by section 5(f) of the Act.

It has also been determined that, notwithstanding foreign availability of the one item subject to increased national security controls as a results of unilateral review, there is adequate evidence demonstrating that the

absence of such controls would prove detrimental to the national security of the United States. The U.S. considers the strategic applications of this equipment to be so significant that unilateral controls are essential pending further efforts to obtain multilateral agreement on controls. The U.S. has initiated negotiations for the purpose of eliminating foreign availability as required by section 5(f) of the Act.

Controls on certain items were removed where it was determined, as a result of the multilateral review, that such controls were no longer necessary, and where it was determined, in accordance with the criteria set forth in the Export Administration Act of 1979, that there was no reason for the United States to maintain such controls unilaterally.

Minor revisions have also been made to correct typographical errors and omissions. In addition, Country Group P, People's Republic of China, has been added to appropriate entries.

I. Supplement No. 1 to Part 385, containing advisory notes for selected CCL entries which identify commodities more likely to be approved than others, is revised as follows:

Supplement No. 1

A. Advisory Notes are added for the following Export Control Commodity Numbers (ECCN):

1131	1532
1133	1533
1355	1534
1371	1568
1510	1595
1522	1763
1529	1767

B. The Advisory Notes for the following ECCN's are deleted:

1110	3612
1145	3635
1416	3637
1560	3638

C. The Advisory Notes and/or commodity descriptions are revised for the following ECCN's:

1205	1547
1353	1548
1361	1549
1501	1555
1519	1558
1520	1559
1526	1564
1537	1565
1541	1572
1544	1584
1545	1586

D. The following entries are renumbered as indicated, to coincide with changes in the Commodity Control List; an asterisk (*) indicates that the Advisory Notes and/or commodity descriptions are revised:

Previous entry No.	*New entry No.*
1072	*1312
3240	3261
3608	*3604
3611	*3605

II. The Commodity Control List, § 399.1, is revised as follows:

A. Results of Multilateral Review

1. The following entries have been added:

1370	1418
1527	1532 (incorporates former entry No. 5091)
1534 (incorporates former entry No. 4589)	1759
1767	

2. Entry No. 1528 is incorporated into entry No. 1526.

3. The following entries are renumbered, and when indicated by an asterisk (*), the commodity descriptions are revised:

Previous entry No.	*New entry No.*
1072	*1312
3127	3131
4127	3131
3240	3261
3323	*3336
3331	3363
3336	*3362
1601	*1371
3608	*3604
3611	*3605
3612	*3609
3635	*3607
3637	*3608
4712	*3709
3715	*3711

4. Jurisdiction over entry No. 1576 is transferred to the Office of Munitions Control, U.S. Department of State, and the entry is deleted from the CCL.

5. The following entry numbers are deleted, and licensing controls are reduced to SZ levels under basket entries as indicated:

Previous entry No.	*Now covered by basket entry No.*
1204	6299
1550	6599
1557	6599
1579	6599
3638	6699
1654	6699
1920	6999

6. Commodity descriptions of the following entries are revised:

1075	1526
1080	1529 (incorporates former entry No. 4568)
1086	1531
1088	1533
1093	1537
1110	1541 (incorporates former entry No. 4541 and part of former entry No. 4584)
2120	1544
1131	1545
1133	1547
1142	1548
1145	1549
1203	1555
1205	1558
1352	1559, 1560
1355	1561
1357	1564
1361	1568
1362	1584 (incorporates part of former entry No. 4584)
1416	1585
1501	
1510	1586
1514	1587
1516	1588
1517	1671
1519	1715
1520	1754
1521	6799
1522	6999

B. Results of Unilateral Review

1. The following entries are added:

4094	4519
4127	4530
4128	4607
4337	4674
4363	5994

2. The following entries, previously covered by exceptions to basket entries, are added to clarify the levels of control:

Added entry No.	*Original basket entry No.*
7599	6599
7999	6999

3. The following entries are renumbered:

Previous entry No.	*New entry No.*
4240	4261
5391	5399

4. Entry No. 5485 is deleted, and commodities formerly covered by that entry No. are reclassified for control to SZ countries under entry No. 6499. Entry No. 5779 is deleted, and those commodities are included under entry No. 4799.

Accordingly, the *Export Administration Regulations* are amended by revising Supplement Number 1 to Part 385 and the Commodity Control List, 15 CFR 399.1, as set forth below.

This Supplement will not appear in 15 CFR Part 385.

BILLING CODE 3510-25-M

ADVISORY NOTES FOR SELECTED CCL ENTRIES

Export Control Commodity Number and Commodity Description

2018A Specialized machinery, equipment, gear, and specially designed parts and accessories therefor, specially designed for the examination, manufacture, testing, and checking of the arms, ammunition, appliances, machines, and implements of war.

NOTE: Licenses are likely to be approved for export to satisfactory end-users of equipment used to determine the safety data of explosives, as required by the International Convention on the Transport of Dangerous Goods (C.I.M.), articles 3 and 4 in Annex 1 RID, provided that such equipment will be used only by the railway authorities of current C.I.M. members, or by Government accredited testing facilities in those countries, for the testing of explosives to transport safety standards, as follows:

(a) Equipment for determining the ignition and deflagration temperatures;

(b) Equipment for steel-shell tests;

(c) Drop hammers not exceeding 20 kg in weight for determining the sensitivity of explosives to shock;

(d) Equipment for determining the friction sensitivity of explosives when exposed to charges not exceeding 36 kg in weight.

1081A Machinery for use in the manufacture of aircraft, as follows:

(a) Machinery specially designed for the working or forming of aircraft sheet, plate or extrusion; or

(b) Machinery specially designed for the milling of aircraft skin.

NOTE: Licenses are likely to be approved for export to satisfactory end-users provided that the machinery does not present an improvement on machinery in production before the 1st January of the year ten years preceding the year of the proposed export.

1091A (a) Units for numerically controlling simultaneously coordinated (contouring and continuous path) movements of machine tools and dimensional inspection machines in two or more axes, *except units having all of the following characteristics:*

(1) Hardwired (not softwired, i.e., not Computerized Numerical Control (CNC));

(2) No more than two contouring interpolating axes can be simultaneously coordinated (interpolating is understood to be any mathematical function including linear and circular; the units may have one or more positioning axes in addition to two contouring axes. The units may have more than one set of two contouring axes (e.g. units controlling two independent railheads on a vertical turret lathe), provided a separate feedrate number is required for each set of two contouring axes, and a single feedrate number (standard or optional) does not control more than two contouring axes);

(3) Minimum programmable increment equal to or greater (coarser) than 0.001 mm (0.0004 in.); and

(4) Without interface to allow direct computer input;

(b) Machine tools and dimensional inspection machines, which according to the manufacturer's technical specifications can be equipped with controls described in sub-entry (a) above, *except:*

(1) Boring mills, milling machines, and machining centers, having all of the following characteristics:

(i) Maximum slide travel in any axis equal to or less than 3,000 mm (10 ft.);

(ii) Positioning accuracy of any axis equal to or greater than ±0.01 mm per 300 mm (0.0004 in./ft.) and 0.005 mm for each additional 300 mm (.0002 in./additional ft.);

(iii) Spindle horsepower equal to or less than 20 kW (25 hp);

(iv) Single-working spindle;

(v) Axial and radial axis motion measured at the spindle axis in one revolution of the spindle equal to or greater than $D \times 2 \times 10^{-6}$ TIR (peak-to-peak) where D is the spindle diameter; and

ADVISORY NOTES FOR SELECTED CCL ENTRIES—(Cont.)

Export Control Commodity Number and Commodity Description

1091A (cont.)

(vi) Not more than 3 axes capable of simultaneously coordinated contouring motion regardless of the NC unit connected to the machine;

(2) Machine tools (other than the machines described in sub-entry (1) above) and dimensional inspection machines having all of the following characteristics:

(i) Positioning accuracy of any axis equal to or greater than ±0.01 mm per 300 mm (0.0004 in./ft.) and 0.005 mm for each additional 300 mm (0.0002 in./additional ft.);

(ii) Radial axis motion measured at the spindle axis equal to or greater than 0.0008 mm (0.00003 in.) TIR (peak-to-peak) in one revolution of the spindle (for lathes and other turning machines); and

(iii) Not more than 3 axes capable of simultaneously coordinated contouring motion regardless of the NC unit connected to the machine; (the machines in sub-entry (b)(*1*)(*iv*) above may have multiple tool heads or turrets, but only one working spindle (standard or optional) may be operative at a time; the machines defined in sub-entries (b)(*1*)(*vi*) and (b)(*2*)(*iii*) above may have more than one work station, but each station shall be limited to 2-axes contouring (e.g. vertical turret lathes with two independent railheads). The machines may have one or more discrete positioning mode axes (e.g. discrete positioning index table) in addition to the three contouring axes. Secondary contouring axes parallel to primary contouring axes (e.g. W-axis of a boring mill that has a primary Z-axis) are not to be considered when determining the number of contouring axes; the value of the positioning accuracy described in sub-entries (b)(*1*)(*ii*) and (b)(*2*)(*i*) above does not include the width of blacklash. This value is determined by the usual statistical methods (random tests), i.e. by approaching from only one direction a minimum of five measurement points up to a maximum of twenty-five measurement positions as random tests along one axis. National standards, e.g. the German VDI standards No. 2354, sheet 1 and/or the United States NMTBA standard ("Definition and Evaluation of Accuracy and Repeatability for Numerically-controlled Machine-Tools," August 1972), can be taken as binding standards for this measuring method);

(c) Direct Numerical Control (DNC) systems consisting of a dedicated stored program computer acting as a host computer and controlling, on-line or off-line, one or more numerically-controlled machine tools or inspection machines, as defined in sub-entry (b) above, related software, and interface and communication equipment for data transfer between the host computer memory, the interpolation functions, and the numerically-controlled machine tools; and

(d) Specially designed sub-assemblies which, according to the manufacturer's technical specifications, can upgrade the capabilities of numerical control units and machine tools to meet the specifications described in sub-entries (a), (b), or (c) above.

NOTE: Licenses are likely to be approved for export to satisfactory end-users of Computer Numerical Control (CNC) units for uses other than aerospace, provided that:

(a) At the time of export, the units are mounted on non-controlled machine tools or equipment;

(b) The CNC units are designed to have all of the following characteristics:

(1) No more than two contouring interpolating axes can be simultaneously coordinated ("Interpolating" is understood to be any mathematical function including linear and circular. Units may not have additional positioning axes.);

(2) The cabinet shall be designed for only 2-axes operation (i.e. there shall be no additional card rack locations, wiring provisions for more than two servo-loops, nor physical space for later additions of these types of items);

(3) Memory is limited to and not capable of being extended beyond that enabling a maximum of two-axes simultaneous velocity and path generation, plus 400 characters (8-bit) of part program storage;

(4) Power supply is limited to two-axes operation;

(5) Minimum programmable increment equal to or greater (coarser) than 0.001 mm.; and

(6) Without interface to enable data exchange with another computer;

ADVISORY NOTES FOR SELECTED CCL ENTRIES—(Cont.)

Export Control Commodity Number and Commodity Description

1091A (cont.)

(c) The information exported with and pertaining to the control unit shall:

(1) Be limited to machine language, binary format, control software enabling a maximum of two-axes simultaneous velocity and path generation;

(2) Not include flow charts, logic diagrams, nor source program documentation for the control software;

(3) Reflect only two-axes parameters in all electrical/mechanical installation, operation, or maintenance documentation.

2120A Cryogenic equipment, the following:

(a) * * *

(b) Electrical, magnetic, and electronic equipment or components, and electrical conductors, specially designed for operation continuously or discontinuously at ambient temperatures below −274° F (−170° C), as follows:

(1) Superconductive metals, alloys, compounds, composites, and intercalate materials, *except:*

(i) Superconductive wire having a filament cross-sectional area of 4.42 x 10^{-5} sq.mm. (or 75 microns diameter) or greater; or

(ii) Superconductive niobium-titanium wire having a filament cross-sectional area of 1.26 x 10^{-4} sq. mm. (or 40 microns diameter) or greater in a copper matrix;

(2) ***

(3) ***

(4) ***

(c) ***

NOTE: Licenses are likely to be approved for export to satisfactory end-users of individual shipments of niobium-titanium wire covered by sub-entry (b)(1) above having a filament cross-sectional area of 9.5×10^{-5} sq.mm. (or 11 microns diameter) or greater in a copper matrix, in quantities not exceeding 10 kg.

1131A Pumps (except vacuum pumps listed under entry No. 1129) having *any* of the following characteristics:

(a) * * *

(b) Having all flow contact surfaces made of 90 percent or more tantalum, titanium, or zirconium, either, separately or combined, *except when such surfaces are made of materials containing more than 97 percent and less than 99.7 percent titanium; and*

(c) * * *

NOTE: Licenses are likely to be approved for export of pumps covered by sub-entry (b) above to bona fide civil end-users for non-aerospace end-uses.

1133A Valves, cocks and pressure regulators having all flow contact surfaces made of 90% or more tantalum, titanium or zirconium, either separately or combined, *except when such surfaces are made of materials containing more than 97% and less than 99.7% titanium.*

NOTE: Licenses are likely to be approved for export of valves, cocks and pressure regulators to bona fide civil end-users for non-aerospace end-uses.

1205A Electro-chemical, semi-conductor, and radioactive devices for the direct conversion of chemical, solar, or nuclear energy to electrical energy, as follows:

(a) Electro-chemical devices, as follows:

(1) Fuel cells operating at temperatures of 392°F (200°C) or less, including regenerative cells, i.e., cells for generating electric power, to which all the consumable components are supplied from outside the

ADVISORY NOTES FOR SELECTED CCL ENTRIES—(Cont.)

Export Control Commodity Number and Commodity Description

1205A (cont.)

cell (the temperature of 392°F (200°C) or less is intended to refer to the fuel cell and not to the fuel conditioning equipment, which may be either an ancillary or an integral part of the fuel cell battery and which may operate at over 392°F (200°C));

(2) ***

(3) ***

(4) ***

(b) ***

(c) Power sources other than nuclear reactors based on radioactive materials systems, *except:*

(1) *Those having an output power of less than 0.5 Watt and a total weight of more than 200 lbs. (90.7 kg); or*

(2) *Those specially designed and developed for medical use within the human body; and*

(d) ***

NOTES: 1. Licenses are likely to be approved for export to satisfactory end-users of fuel cells covered by sub-entry (a)(1) above, having a maximum output power level greater than 10 kW using gaseous pure hydrogen and oxygen/air reactants, alkaline electrolytic, and a catalyst support by carbon either pressed on a metal mesh electrode, or attached to a conducting porous plastic.

2. Licenses are likely to be approved for export to satisfactory end-users of devices covered by sub-entry (c) above, having an output power of 0.5 Watt or more and an overall efficiency of 6 percent or less. (The overall efficiency is obtained by dividing the electrical output, expressed in watts, by the thermal input, expressed in watts. It is understood that this efficiency is to be measured at the beginning of life.)

3261A Neutron generator systems, including tubes, designed for operation without an external vacuum system. and utilizing electrostatic acceleration to induce a tritium-deuterium nuclear reaction; and specially designed parts therefor.

NOTE: Licenses are likely to be approved for the export to satisfactory end-users of tubes and systems whose technical specifications are essentially the same as those for previously approved exports, provided that they are for civil use.

1312A Presses and specialized controls, accessories, and parts therefor, as follows:

(a) * * *

(b) Hydraulic presses, as follows:

(1) Vertical presses having a total rated force of over 10,000 tons; or

(2) Horizontal presses having a total rated force of over 5,000 tons;

(c) Isostatic presses, as follows (isostatic presses are those capable of pressurizing a closed cavity through various media (gas, liquid, solid particles, etc.) to create equal force in all directions within the cavity upon a workpiece or material):

(1) Capable of achieving a maximum working pressure of 20,000 psi (1,406 kg/cm²) or greater and possessing a chamber cavity with an inside diameter in excess of 16 inches (40.6 cm); or

(2) Capable of achieving a maximum working pressure of 5,000 psi (351 kg/cm²) or greater and having a controlled thermal environment within the closed cavity, *except those possessing a chamber cavity with an inside diameter of less than 5 inches (127 mm) and which are also capable of achieving and maintaining a controlled thermal environment only between +176°F (+80°C) and −31°F (−35°C);* and

(d) Control equipment, accessories, and parts which are specially designed for the above presses.

ADVISORY NOTES FOR SELECTED CCL ENTRIES—(Cont.)

Export Control Commodity Number and Commodity Description

1312A (cont.)

NOTES: 1. Licenses are likely to be approved for export to satisfactory end-users of hydraulic presses covered by sub-entry (b) above, provided that:

(i) The total rated force is less than 30,000 tons for vertical presses, and 10,000 tons or less for horizontal presses;

(ii) The presses are not specially designed for use in forming aircraft, missile or space vehicle parts, in powder metallurgy or in ceramics production; and

(iii) The presses could not reasonably be used for strategic purposes.

2. Licenses are likely to be approved for export to satisfactory end-users of isostatic presses covered by sub-entry (c) above, provided that:

(i) Isostatic presses having a controlled thermal environment within the closed cavity are limited as follows:

(a) Maximum working pressure not exceeding 20,000 psi (1,406 kg/cm²);

(b) Chamber cavity with an inside diameter not exceeding 10 inches (25.4 cm);

(c) Capable of achieving and maintaining a controlled thermal environment within the closed cavity of no greater than 1,200°C;

(ii) Isostatic presses, other than those dealt with under sub-paragraph (i) above, are limited as follows:

(a) Maximum working pressure not exceeding 30,000 psi (2,109 kg/cm²);

(b) Chamber cavity with an inside diameter not exceeding 20 inches (50.8 cm);

and provided the equipment will be used for specific non-strategic applications and will not be be used for any nuclear or aerospace applications.

3. Licenses are likely to be approved for export to satisfactory end-users of normal amounts of equipment covered by sub-entry (d) above to service presses licensed for export under Note 1 above.

1353A Equipment specially designed for the manufacture of communication cable described in entry No. 1526.

NOTE: Licenses are likely to be approved for export to satisfactory end-users of equipment specially designed for the manufacture of cable covered by entry No. 1526 sub-entry II (b).

1355A Machinery and equipment for the manufacture of electronic equipment, components and materials; related test gear; parts and specialized controls and accessories thereof, as follows:

(a) * * *

(b) Equipment for the manufacture of semi-conductor, acoustic wave and film memory devices, of electronic equipment and components covered by sub-entry 1564 II (b) and (c), and of parts, materials and sub-assemblies thereof, as follows:

(1) Equipment for the processing of semi-conductor materials for the manufacture of devices, equipment and components specified in the heading of this sub-entry as follows:

(i) * * *

(ii) Crystal pullers, furnaces, and gas systems, as follows:

(a) * * *

(b) * * *

(c) * * *

(d) * * *

(e) Crystal pullers having any of the following characteristics:

(1) * * *

ADVISORY NOTES FOR SELECTED CCL ENTRIES—(Cont.)

Export Control Commodity Number and Commodity Description

1355 (cont.)

(2) Capable of operation at pressures above 10^5 pascals (1 atmosphere absolute);

(3) * * *

(f) * * *

(iii) * * *

(iv) * * *

(v) * * *

(vi) * * *

(vii) * * *

(viii) * * *

(ix) * * *

(2) * * *

(3) * * *

(4) * * *

(5) * * *

(6) * * *

NOTE: Licenses are likely to be approved for satisfactory civil end-users of crystal pullers covered by sub-paragraph (b)(1)(ii)(e)(2) above which can be operated at pressures up to 2.5×10^5 pascals (2.5 atmospheres absolute).

1361A Wind tunnels, as follows:

(a) Supersonic (Mach 1.4 to Mach 5), hypersonic (Mach 5 to Mach 15) and hypervelocity (above Mach 15) wind tunnels, *except wind tunnels specially designed for educational purposes and having a test section size (measured internally) of less than 10 in.* (25 cm). (By "test section size" is understood the diameter of the circle, or the side of the square, or the longest side of the rectangle constituting possible shapes of the test section.);

(b) ***

(c) ***

(d) Specially designed parts and accessories.

NOTES: 1. Licenses are likely to be approved for export to satisfactory end-users of superonic wind tunnels which are capable of Mach velocities of 1.4 or more but less than 5, and are not specially designed for or fitted with means of preheating the air.

2. Licenses are likely to be approved for export to satisfactory end-users of specialized parts and assemblies covered by sub-entry (d) for wind tunnels previously exported under Note 1, provided that such parts and assemblies will not upgrade the performance of the wind tunnel and, for normally-consumable replacement parts, will not exceed a 6-month supply.

1371A Anti-friction bearings, as follows:

(a) Ball and roller bearings having an inner bore diameter of 10 mm or less and tolerances of ABEC 5, RBEC 5 (or national equivalents) or better and either of the following characteristics:

(1) Made of special materials, *i.e.* with rings, balls or rollers made from any steel alloy or other material including, but not limited to high-speed tool steels, Monel metal, beryllium, metaloids, ceramic, and sintered metal composites, *except the following: low-carbon steel; SAE-52100 high carbon chromium steel; SAE-4615 nickel molybdenum steel; AISI-440C (SAE 51440C) stainless steel; or national equivalents;* and/or

(2) Manufactured for use at normal operating temperatures over 302°F (150°C) either by use of special materials or by special heat treatment;

(b) Ball and roller bearings *except separable ball bearings and thrust ball bearings,* having an inner bore diameter exceeding 10 mm and having tolerances of ABEC 7, RBEC 7 (or national equivalents) or better (ABEC 5 in the case of hollow bearings) and either of the following characteristics:

ADVISORY NOTES FOR SELECTED CCL ENTRIES—(Cont.)

Export Control Commodity Number and Commodity Description

1371A (cont.)

(1) Made of special materials, *i.e.* with rings, balls or rollers made from any steel alloy or other material including, but not limited to high-speed tool steels, Monel metal, beryllium, metaloids, ceramic, and sintered metal composites, *except the following: low-carbon steel; SAE-52100 high carbon chromium steel; SAE-4615 nickel molybdenum steel; AISI-440C (SAE 51440C) stainless steel; or national equivalents;* and/or

(2) Manufactured for use at normal operating temperatures over 302°F (150°C) either by use of special materials or by special heat treatment;

(c) Ball and roller bearings having tolerances better than ABEC 7 (or national equivalents); and

(d) Bearing parts usable only for bearings covered by this entry, as follows: outer rings, inner rings, retainers, balls, rollers, and sub-assemblies. (See § 376.7.)

NOTE: Licenses are likely to be approved for export of reasonable quantities of bearings covered by this item to satisfactory civil end-users which have furnished assurances that the bearings will be incorporated in equipment previously imported from Canada or countries in Country Group T or V.

1485A Compasses, gyroscopes, accelerometers, and inertial equipment, as follows:

(a) ***

(b) Integrated flight instrument systems for aircraft which include gyrostabilizers and/or automatic pilots (An integrated flight instrument system is a primary instrument display system of attitude and azimuth with facilities for giving maneuver guidance information to the pilot and often integrated with an autopilot to the extent of embodying a common unit for setting up the required demands);

(c) ***

(d) Gyrostabilizers used for other purposes than aircraft control, *except those for stabilizing an entire surface vessel;*

(e) ***

(f) Accelerometers with a threshold of 0.005 g or less, or a linearity error within 0.25 percent of full scale output or both, which are designed for use in inertial navigation systems or in guidance systems of all types;

(g) Gyros with a rated free directional drift rate (rated free precession) of less than 0.5 degree (1 Sigma or r.m.s.) per hour in a 1 g environment;

(h) ***

(i) Specially designed parts and components, and test, calibration, and alignment equipment for the above.

NOTE: Licenses are likely to be approved for export to satisfactory end-users of equipment, as follows:

(a) Types and series covered by sub-entry (b) above, provided the equipment has been in normal civil use for more than two years, is standard equipment of aircraft excluded from control under entry No. 1460, and is, or is to be, installed in civilian aircraft.

(b) Types and series covered by sub-entry (d) above, provided the equipment has been in normal civil use for more than two years and is intended for a clearly civil application in the importing country.

(c) Parts, components and equipment covered by sub-entry (i) above, provided they are not also covered by sub-entries (f) and (g) above, and are intended for use with exports meeting the conditions of sub-paragraphs (a) and (b) of this Note.

1501A Navigation, direction finding, radar and airborne communication equipment, as follows: (See also entry No. 1485 sub-entries (b) and (h), and entry No. 2120 sub-entries (b) and (c).)

(a) Airborne communication equipment and specialized parts and components therefor, having *any* of the following characteristics:

(1) Designed to operate at frequencies greater than 156 MHz;

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Export Control Commodity Number and Commodity Description

1501A (cont.)

(2) Incorporating facilities for:

(i) The rapid selection of more than 200 channels per equipment, or

(ii) Equipment using frequency synthesis techniques (see also entry No. 1531), *except equipment operating in the frequency range of 108 to 136 MHz with 720 channels or fewer at not less than 25 kHz spacing, and which has been in normal civil use for at least one year;*

(3) Pressurized throughout;

(4) Rated for continuous operation over a range of ambient temperatures extending from below −55°C to +55°C; or

(5) Designed for modulating methods employing any form of digital modulation using time and frequency redundancy such as "Quantized Frequency Modulation" (QFM);

(b) Navigation and direction finding equipment (and specialized parts and accessories, specialized testing or calibrating equipment and training or simulating equipment therefor), as follows:

(1) Airborne navigation equipment and direction finding equipment, as follows:

(i) Designed to make use of "Doppler" frequency phenomena;

(ii) Utilizing the constant velocity and/or rectilinear propagation characteristics of electromagnetic waves having frequency less than 4×10^{14} Hz (0.75 micron);

(iii) Radio altimeters, the following:

(*a*) Pulse modulated;

(*b*) Frequency modulated having a displayed electrical output accuracy better than ±3 feet (±0.914 m) over the range between 0 and 100 feet (30.4 m) or better than ±3 percent above 100 feet (30.4 m); or

(*c*) Frequency modulated which have been in normal civil use for less than one year;

(iv) Direction finding equipment operating at frequencies greater than 5 MHz, *except equipment specially designed for search and rescue purposes, provided that the receiver operates on a crystal controlled fixed frequency of 121.5 MHz or on alternating frequencies of 121.5 MHz and 243 MHz;*

(v) Pressurized throughout; or

(vi) Rated for continuous operation over a range of ambient temperatures extending from below −55°C to above +55°C;

(2) Ground and marine equipment for use with airborne navigation equipment utilizing the constant velocity and/or the rectilinear propagation characteristics of electromagnetic waves having frequency less than 4×10^{14} Hz (0.75 micron); or

(3) Ground and marine direction finding equipment operating at frequencies greater than 30 MHz; and

(c) Radar equipment and specialized parts and accessories, specialized testing or calibrating equipment and training or simulating equipment therefor, as follows: (For Lidar Equipment see entry No. 1522.)

(1) Airborne radar equipment; or

(2) Ground and marine radar equipment having one or more of the following features:

(i) Operating at a frequency not in normal civil use or at a frequency of more than 10.5 GHz;

(ii) Operating at a frequency of less than 1.5 GHz and having a peak output power from the transmitter greater than 2.5 MW; or operating at a frequency within the range of 1.5 to 3.5 GHz and having a peak output power from the transmitter greater than 1.5 MW; or operating at a fre-

ADVISORY NOTES FOR SELECTED CCL ENTRIES—(Cont.)

Export Control Commodity Number and Commodity Description

1501A (cont.)

quency within the range of 3.5 to 6 GHz and having a peak output power from the transmitter greater than 1 MW; or operating at a frequency within the range of 6 to 10.5 GHz and having a peak output power from the transmitter greater than 500 kW;

(iii) Operating at a frequency of less than 3.5 GHz and having an 80 percent or better probability of detection for a 10 sq. m. target at a free space range of 250 nautical miles; or operating at a frequency within the range of 3.5 to 10.5 GHz and having an 80 percent or better probability of detection for a 10 sq. m. target at a free space range of 100 nautical miles;

(iv) Utilizing other than pulse modulation with a constant and/or staggered pulse repetition frequency, in which the carrier frequency of the transmitted signal is not changed deliberately between groups of pulses, from pulse to pulse or within a single pulse, *except civil commercial airport radars using a carrier frequency that may change from pulse to pulse between two fixed frequencies separated in time and in frequency by constant magnitudes;*

(v) Utilizing a Doppler technique for any purpose, other than M.T.I. systems using a conventional double or triple pulse delay line cancellation technique *except those utilized for surveillance and control radar for aerial navigation in civil airports;*

(vi) Including any digital signal processing techniques used for automatic target tracking, or having a facility for electronic tracking;

(vii) Including signal processing techniques other than those covered by sub-entry (c)(2)(vi) above, which have been in normal civil use for a period of less than two years; or

(viii) In the case of ground radar, having been in commercial use for a period of less than one year.

NOTES: 1. Licenses are likely to be approved for export to satisfactory end-users of commercial airborne equipment needed to equip civil aircraft, or as normal standard equipment incorporated in civil aircraft being exported for civil commercial use, and not containing characteristics in sub-entry (a)(5) above.

2. Licenses are likely to be approved for export to satisfactory end-users of navigation equipment covered by sub-entry (b)(1)(i) above, provided that it is to be installed in civil aircraft or helicopters, and is normal standard equipment of a type installed in civil aircraft or helicopters in TV country groups.

3. Licenses are likely to be approved for export to satisfactory end-users of standard commercial airborne equipment listed in sub-entries (b)(1)(ii) and (iii) above, needed to equip civil aircraft, or as normal standard equipment incorporated in civil aircraft being exported for civil commercial use, provided that such equipment is equivalent in all characteristics and performance to standard equipment of aircraft not subject to control, and which:

(a) For equipment covered by sub-entry (b)(1)(ii) above, is in conformity with ICAO standards and assures no function exceeding those resulting from such standards, and is not designed to make use of hyperbolic grids at frequencies greater than 3 MHz. (Standard commercial airborne equipment designed to make use of hyperbolic grids at frequencies of less than 3MHz may be exported if coordinate conversion equipment, which has been in normal civil use for less than one year, or which could not be shipped under the provisions of entry No. 1565, is not included and is not separately supplied), and

(b) For equipment covered by sub-entry (b)(1)(iii) above, are frequency modulated radio altimeters which have been in normal civil use for a period of more than one year.

4. Licenses are likely to be approved for export to satisfactory end-users of ground equipment for use at civil airports or for civil use in association with airborne equipment which meets the criterion of Note 3 to sub-entry (b)(1)(ii) above, and approved for export, provided that such equipment:

ADVISORY NOTES FOR SELECTED CCL ENTRIES—(Cont.)

Export Control Commodity Number and Commodity Description

1501A (cont.)

(a) is in conformity with ICAO standards and assures no function exceeding those resulting from such standards;

(b) is not designed to make use of hyperbolic grids at frequencies greater than 3 MHz.

5. Licenses are likely to be approved for export to satisfactory end-users of equipment covered by sub-entry (b)(3) above, provided:

(a) The equipment is to be installed at civil airports or for use on civil air routes;

(b) The equipment is designed to operate at frequencies between 30 MHz and 157 MHz, excluding single side band equipment;

(c) The equipment employs a loop system or a system employing a number of spaced vertical aerials uniformly disposed around the circumference of a circle, excluding electronically commutated types.

6. Licenses are likely to be approved for export to satisfactory end-users of equipment covered by sub-entry (c) above, when it is to be installed in civil aircraft, provided that this equipment:

(a) Has been in normal commercial service for at least one year;

(b) Is specially designed for use as a commercial weather radar;

(c) Is a normal and reasonable equipment for such civil aircraft; and

(d) Does not contain significant advanced technology of strategic value for other applications.

7. Licenses are likely to be approved for export to satisfactory end-users of secondary radar equipment covered by sub-entry (c) above, designed specifically for civil air traffic identification and control purposes.

8. Licenses are likely to be approved for export to satisfactory end-users of the following:

(a) Radar equipment covered only sub-entries (c)(2)(i), (ii) and/or (iii) above, provided that both of the following conditions are met:

(i) It is specially designed for the surveillance and coordination of airfield surface traffic; and

(ii) It is to be installed at airports operating scheduled commercial flights.

(b) Radar equipment covered only by sub-entries (c)(2)(ii) or (iii) above, or by both, provided that all the following conditions are met:

(i) Operating at a frequency of not more than 1.5 GHz and having a peak output power from the transmitter not greater than 5 MW; or operating at a frequency within the range of 1.5 to 3.5 GHz and having a peak output power not greater than 2.5 MW;

(ii) Having an 80 percent or better probability of detection for a 10 sq.m. target at a free space range of 270 nautical miles;

(iii) Having a pulse repetition frequency exceeding 300 pulses per second; and

(iv) It is to be installed for air traffic control of scheduled international commercial flights;

(c) Radar equipment covered only by sub-entries (c)(2)(iv) and/or (v) above, provided it is to be installed for air traffic control purposes in international airports and has been in normal civil use for a period of not less than three years;

ADVISORY NOTES FOR SELECTED CCL ENTRIES—(Cont.)

Export Control Commodity Number and Commodity Description

1501A (cont.)

(d) Radar equipment covered by sub-entry (c)(2)(vi) above, provided it is specially designed for marine, harbor or meteorological use, or has been in normal civil use for not less than three years;

(e) Radar equipment covered only by sub-entry (c)(2)(vii) above, provided it is specially designed for marine (or harbor) use, or radar equipment covered only by sub-entries (c)(2)(vii) or (viii) above, or both, provided it is specially designed for meteorological observation.

1502A Communication, detection or tracking equipment of a kind using ultra-violet radiation, infrared radiation or ultrasonic waves; *except ultrasonic devices which operate in contact with a controlled material to be inspected, or which are used for industrial cleaning, sorting or materials handling, industrial and civilian intrusion alarm, traffic and industrial movement control and counting systems, medical applications, emulsification, homogenisation, or simple educational or entertainment devices; underwater ultrasonic communications equipment designed for operation with amplitude modulation and having a communications range of 500 m or less (sea state 1), a carrier frequency of 40 to 60 kHz and a carrier power supplied to the transducer of 1 W or less; industrial equipment employing cells not described in entry Nos. 1548 or 1550; industrial and civilian intrusion alarm, traffic and industrial movement control and counting systems; medical equipment; industrial equipment used for inspection, sorting or analysis of the properties of materials; simple educational or entertainment devices which employ photo cells; flame detectors for industrial furnaces; equipment for non-contact temperature measurement for laboratory or industrial purposes utilizing a single detector cell with no scanning of the detector; or instruments capable of measuring radiated power or energy having a response time constant exceeding 10 milliseconds;* and specialized parts therefor.

NOTE: Licenses are likely to be approved for export to satisfactory end-users of infra-red geodetic equipment covered by this entry, provided that the equipment uses a lighting source other than a laser and is manually operated, or that it uses a lighting source (other than a laser or a light-emitting diode) remote from the measuring equipment.

1510A Acoustic and/or ultrasonic systems or equipment specially designed for detecting or locating underwater or subterranean objects or features, and specially-designed components of such systems or equipment (including but not limited to hydrophones and transducers, towed hydrophone arrays, software therefor, and beamformers), *except:*

(i) *Marine systems or equipment, as follows:*

(A) * * *

(B) Passive (receiving, whether or not related in normal application to separate active equipment) acoustic hydrophones and/or transducers having *all* of the following characteristics:

(1) Incorporating sensitive elements made of piezoelectric ceramics or crystal, and with a sensitivity no greater than —192 dB (reference 1 volt per micropascal);

(2) Not designed for operation at depths greater than 100 meters;

(3) Independently mounted or configured and not reasonably capable of assembly by the users into a towed hydrophone array;

(ii) * * *

NOTES: 1. Licenses are likely to be approved for export for civil end-use by civil end-users of acoustic hydrophones and transducers which have all of the other characteristics of sub-entry (i)(B), but which either:

(a) Have a sensitivity no greater than —204 dB (reference 1 volt micropascal), and are designed for operation at greater than 100 meters depth but not greater than 1,000 meters depth; or

(b) Are not acceleration compensated, have a sensitivity no greater than —180 dB (reference 1 volt per micropascal) and are not designed for operation at depths greater than 100 meters.

2. Licenses are likely to be approved for export for civil end-use by civil end-users of towed acoustic hydrophone arrays having all of the following characteristics:

ADVISORY NOTES FOR SELECTED CCL ENTRIES—(Cont.)

Export Control Commodity Number and Commodity Description

1510A (cont.)

(a) Not specially designed for operation at greater than 100 meters depth or at tow speeds in excess of 8 knots;

(b) Not incorporating temperature or heading sensors;

(c) Having hydrophone groups uniformly spaced at not less than 25 meters and not more than 60 meters;

(d) Having an assembled diameter of 40 mm or greater and using metallic strength members only;

(e) Not having multiplexed hydrophone group signals;

(f) Not having a configuration for multiple or overlapping acoustic aperture operation;

(g) Not having characteristics better than those specified in sub-entries (i)(B)(1) and (2) above;

(h) Not having associated processing equipment which provides any of the following features:

(1) Electronically-steerable beamforming capabilities;

(2) Side-lobe suppression techniques such as shading coefficients;

(3) On-line real-time processing or off-line batch pre-processing capabilities exceeding the limits specified in entries 1529 and 1565.

1519A Single and multi-channel communications transmission equipment, including terminal, intermediate amplifier or repeater equipment and multiplex equipment used for communications (line, cable, optical fiber cable, or radio) systems, and data modems making use of the aforementioned communication systems and associated multiplex equipment, *except telemetering, telecommand and telesignalling equipment designed for industrial purposes, together with data transmission equipment not intended for the transmission of written or printed text and specialized parts, accessories and test equipment therefor (by telemetering, telecommand and telesignalling equipment is meant: sensing heads for the conversion of information into electrical information, the systems used for its long-distance transmission, the processes used to translate electrical information into coded data (telemetering), into control signals (telecommand), and into display signals (telesignalling)); facsimile equipment other than that employing cipher, cryptographic and/or coding devices and equipment that are designed to ensure the secrecy of communications and thus prevent clear reception by anyone other than the intended receiver (see Supplement No. 2 to Part 370); equipment employing exclusively the direct current transmission technique; electronic measuring equipment, suitable for use with PCM transmission equipment defined in CCITT recommendation series G 700 (ITU Geneva)*, as follows:

(a) Employing analog transmission techniques with analog input and output, designed to deliver, carry or receive baseband frequencies higher than 19 MHz into, or in, a communications system, but only higher than 300 kHz for equipment suitable for use with submarine cable (analog transmission techniques include, inter alia, frequency division multiplex (FDM));

(b) Employing digital transmission techniques designed for operation at a data signalling rate exceeding 2.1 Megabits per second, with analog input and output, designed for use on communications circuits (digital transmission techniques include, inter alia, pulse code modulation (PCM));

(c) Data communications equipment employing digital transmission with digital input and output, including telegraphic and data transmission, having any of the following characteristics:

(1) Designed for operation at a data signalling rate in bits per second, excluding servicing and administrative channels, numerically exceeding either:

(i) 4,800; or

(ii) 160 percent of the channel (or sub-channel) bandwidth in Hertz;

(2) Employing an automatic error detection and correction system having both of the following characteristics:

(i) Retransmission is not required for correction; and

ADVISORY NOTES FOR SELECTED CCL ENTRIES—(Cont.)

Export Control Commodity Number and Commodity Description

1519A (cont.)

(ii) A data signalling rate exceeding 300 bits per second; and

(d) Components, accessories, and sub-assemblies specially designed for the above equipment, and test equipment specially designed for the equipment covered by sub-entry (b) above, except connectors for use with optical fibers or cable with a repeatable coupling loss of 0.5 dB or more.

NOTES: 1. Licenses are likely to be approved for export to satisfactory end-users of equipment covered by sub-item (a) above, and components, accessories and sub-assemblies thereof, as follows:

(a) Equipment specially designed for the transmission of television signals by cable between camera and studio or between studio and television transmitter not exceeding 50 miles (80 km) for a link with respect to any one installation. (For radio relay links see entry No. 1520.)

(b) Equipment to be used for closed circuit television or television distribution (community aerial systems and cable television systems) with an upper frequency limit of 960 MHz.

(c) Equipment designed to deliver, carry or receive baseband frequencies up to and including 62 MHz.

2. Licenses are likely to be approved for the export to satisfactory end-users of equipment covered by sub-item (b) above, and components, accessories and sub-assemblies and cable therefor, provided that it is for other than submarine use, is to be permanently installed in a circuit operated by the civilian authorities of the importing country, and is to be used for general commercial traffic, as follows:

(a) A total digital bit rate at the highest level multiplex point of 8.5 million bits per second or less; and either

(b) A total number of voice channels per each physical bearer (wire or radio) of 120 or less; or

(c) A monochrome or color television channel with a maximum nominal bandwidth of 6 MHz, and associated sound channels.

3. Licenses are likely to be approved for the export to satisfactory end-users of the data modems described in sub-entry (c)(1) above, conforming to CCITT recommendations and/or specially designed for civil end-use, and operating at speeds up to 9,600 bits per second or 320% of the channel (or sub-channel) bandwidth in hertz, provided they are to be permanently installed in a circuit operated by the civilian authorities of the importing countries for general commercial traffic.

1520A Radio relay communications equipment designed for use at frequencies exceeding 960 MHz, and components, accessories and sub-assemblies therefor.

NOTES: 1. Licenses are likely to be approved for export to satisfactory end-users of equipment covered by this item, and components, accessories and sub-assemblies therefor, specially designed for the transmission of television signals between camera and studio or between studio and television transmitter, and not exceeding a line of sight distance with respect to any one installation.

2. Licenses are likely to be approved for export to satisfactory end-users of equipment covered by this item, and components, accessories and sub-assemblies therefor, as follows:

(a) Ground communication radio equipment for use with temporary fixed services operated by the civilian authorities of the importing country and designed to be used at fixed frequencies not exceeding 13.5 GHz with a power output of not more than 5 watts;

(b) Equipment to be permanently installed in a circuit operated by the civilian authorities of the importing country for civil television transmission or for general commercial traffic, provided that:

(1) Associated multiplex equipment is considered separately under the provisions of entry No. 1519; and

(2) No equipment with a base bandwidth exceeding the limits set forth in Note 3 to entry No. 1519 is included.

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Export Control Commodity Number and Commodity Description

1520A (cont.)

3. Licenses are likely to be approved for export to satisfactory end-users of equipment covered by this item, for communications satellite earth stations provided that it is to be installed for operation in the framework of an INTELSAT satellite communications system.

4. Licenses are likely to be approved for export to satisfactory end-users of equipment with a maximum capacity of 300 voice channels of4 kHz each, components, accessories, sub-assemblies and specialized test equipment for industrial use, e.g. remote supervision, control and metering of oil and gas pipelines, public utility services (e.g. electricity networks) including telephone channels for the operation of such networks and the engineering service circuits required for the maintenance of telecommunications links.

5. Licenses are likely to be approved for the export to satisfactory end-users of tropospheric scatter communication equipment, and components, accessories and sub-assemblies therefor, covered by this entry, provide that it will be permanently installed at specified sites for civil communication purposes and has all of the following characteristics:

(a) Fixed frequency of 2.7 GHz or less;

(b) Frequency modulation;

(c) Power amplifier output of 10 kW or less.

1522A Lasers and laser systems (including active and passive components in semi-fabricated forms as well as in fabricated forms) and equipment containing them, as follows:

(a) Lasers and specially designed components and parts therefor, including amplification stages, *except the following when not contained in equipment:*

(i) * * *

(ii) * * *

(iii) * * *

(iv) * * *

(v) * * *

(vi) Nd: YAG lasers having an output wavelength of 1.06 micrometers with either of the following characteristics:

(1) A pulsed output not exceeding 0.5 joule per pulse and a maximum rated average single- or multi-mode output power not exceeding 10 watts or a continuous wave maximum rated single- or multi-mode output power not exceeding 50 watts;

(2) * * *

(vii) Nd: Glass lasers with both of the following characteristics:

(1) An output wavelength of 1.06 micrometers;

(2) A pulsed output not exceeding 0.5 joule per pulse;

(viii) * * *

(ix) * * *

(x) * * *

(b) Equipment containing lasers and laser systems, *except equipment listed below containing lasers listed in (a) above as exceptions:*

(i) Specially designed for industrial and civilian intrusion detection and alarm systems;

(ii) Specially designed for medical applications;

(iii) Equipment for educational and laboratory purposes;

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Export Control Commodity Number and Commodity Description

1522A (cont.)

(iv) Specially designed for traffic and industrial movement control and counting systems;

(v) Specially designed for detection of environmental pollution;

(vi) Optical spectrometers and densitometers;

(vii) Equipment containing continuous wave helium-neon gas lasers but see sub-entries (c) and (d) below;

(viii) Textile-cutting and textile-bonding equipment;

(ix) Paper cutting equipment;

(x) Equipment containing lasers for drilling diamond dies for the wire drawing industry;

(xi) Electronic daylight scanning equipment with auxiliary electronic screening units specially designed for printing processes;

(xii) Laser-radar (lidar) equipment specially designed for surveying or meteorological observation;

(xiii) Consumer disc-type video and audio recorders and reproducers;

(xiv) Price scanners (point of sale); and

(xv) Systems designed for surveying purposes; provided there is no capability of measuring range;

(c) * * *

(d) * * *

NOTE: Licenses are likely to be approved for export to satisfactory end-users of equipment listed in sub-entry (b) containing lasers described in (a)(vi)(1) and (vii) provided the lasers have a maximum pulsed output not exceeding 2 joules per pulse. The shipment of spare laser rods for equipment exported under this Note will be restricted to rods having no greater output power and/or energy capability than those originally exported with the equipment.

1526A Cable, as follows:

I. * * *

II. Communications cable, as follows:

(a) Submarine cable, as follows:

(1) Reversed-twist, double-armored cable used for towing or suspending and communicating with submerged devices;

(2) Unarmored or single-armored ocean cable having an attenuation of 1.8 dB per nautical mile (0.97 dB/km) or less, measured at a frequency of 600 kHz;

(b) Coaxial cable using a dielectric aired by discs, beads, spiral, screw, or any other means, with an inner diameter of the outer conductor of the cores greater than 14 mm (0.551 in.);

(c) Graded index or single-mode step index optical fiber communications cable and optical fibers therefor, having either of the following characteristics:

(1) An attenuation at any operating wavelength of 5 dB/km or less;

(2) A tensile strength greater than 7×10^8 N/m^2; or

(d) * * *

NOTES: 1. Licenses are likely to be approved for the export to satisfactory end-users of cable covered by sub-entry II(a)(1) above when used for civil applications in oceanographic research or in natural resources exploration.

2. Licenses are likely to be approved for the export to satisfactory end-users of cable covered by sub-entries II(a)(2), (b) and (c) above, provided that:

ADVISORY NOTES FOR SELECTED CCL ENTRIES—(Cont.)

Export Control Commodity Number and Commodity Description

1526A (cont.)

(a) The cable is for a specific civil end-use;

(b) The quantities of cable required are normal for the purpose; and

(c) (applicable to sub-entry II(c) above only) The cable is not specially designed for underwater use.

1529A Electronic measuring, calibrating, counting, testing, and/or time interval measuring equipment, whether or not incorporating frequency standards, having any of the following characteristics:

(a) Equipment, as follows:

(1) * * *

(2) Designed for fixed ground use and containing frequency standard(s), with a stability over 24 hours of 1 part in 10^9 or better; or

(3) * * *

(b) Instruments, as follows:

(1) * * *

(2) * * *

(3) * * *

(4) Spectrum analyzers employing time compression of the input signal or FFT (Fast Fourier Transform) techniques;

(5) Incorporating computing facilities with user accessible reprogramming capability and an alterable memory of more than 8,192 bits;

(6) * * *

(c) * * *

(d) * * *

(e) * * *

(f) * * *

(g) * * *

(h) * * *

NOTES: 1. Licenses are likely to be approved for export to satisfactory end-users of items covered only by sub-entry (a)(2) above, provided that:

(a) The stability over 24 hours is not better than 5 parts in 10^{10}; and

(b) The equipment is a reasonable requirement for the stated legitimate civil end-use.

2. Licenses are likely to be approved for export to satisfactory end-users of items covered by sub-entry (b)(4) above, having either of the following characteristics:

(a) Capable of computing 512 complex spectral lines in 200 milliseconds or more;

(b) Capable of computing 512 real spectral lines in 100 milliseconds or more.

3. Licenses are likely to be approved for export to satisfactory end-users of instruments covered by sub-entry (b)(5) above, provided that:

(a) The instruments have been designed for non-strategic use and by nature of design, software, microprogram control (firmware), specialized logic control (hardware) or performance are substantially restricted to the particular application for which they have been designed.

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Export Control Commodity Number and Commodity Description

1529A (cont.)

(b) The instruments are not covered by any other part of this entry and do not exceed the limits of Note 4 to entry No. 1565.

1531A Frequency synthesizers (and equipment containing such frequency synthesizers), as follows (frequency synthesizer means any kind of frequency source or signal generator, regardless of the actual technique used, providing a multiplicity of simultaneous or alternative output frequencies, from one or more outputs, controlled by, derived from or disciplined by a lesser number of standard (or master) frequencies):

(a) * * *

(b) Instrument frequency synthesizers and synthesized signal generators designed for ground laboratory use, producing output frequencies whose accuracy and short and long term stability are controlled by, derived from or disciplined by the input frequency or internal master standard frequency, and having any of the following characteristics:

(1) * * *

(2) * * *

(3) Electrically programmable (in that the output frequency can be controlled or selected by the injection of digitally coded electrical signals from an external control source) with a switching speed from one selected output frequency to another selected output frequency less than 10 milliseconds;

(4) * * *

(5) * * *

(6) * * *

(7) * * *

(c) * * *

(d) * * *

(e) * * *

NOTE: Licenses are likely to be approved for export to satisfactory end-users of equipment covered by subentry (b)(3) above, with a switching speed not less than 5 milliseconds.

1532A Precision linear and angular measuring systems and components, as follows:

(a) Contact-type systems and linear voltage differential transformers (LVDT) therefor, as follows:

(1) Systems having all of the following characteristics:

(i) Range equal to or less than 5 mm;

(ii) Linearity equal to or less than 0.1 percent;

(iii) Drift equal to or less than 0.1 percent per day at standard ambient test room temperatures ±1°C;

(2) Linear voltage differential transformers with no compensation networks and having either of the following characteristics:

(i) Range equal to or less than 5 mm;

(ii) Linearity equal to or less than 0.2 percent; (linearity measurements are made in the static mode);

(b) Linear measuring machines, *except optical comparators*, with two or more axes having both of the following characteristics:

(1) Range in any axis greater than 200 mm;

(2) Accuracy (including any compensation) less (finer) than 0.0008 mm per any 300 mm segment of travel;

ADVISORY NOTES FOR SELECTED CCL ENTRIES—(Cont.)

Export Control Commodity Number and Commodity Description

1532A (cont.)

(c) Angular measuring systems having an accuracy equal to or less than 1 second of arc, *except optical instruments, such as autocollimators, using collimated light to detect angular displacements of a mirror;*

(d) Non-contact type systems having either of the following characteristics:

(1) Effective probe measurement diameter less than 0.5 mm and drift less than 0.5 percent per day at standard ambient test room temperatures ±1°C;

(2) Linearity less than 0.3 percent and drift less than 0.5 percent per day at standard ambient test room temperature ±1°C.

NOTE: Licenses are likely to be approved for export of equipment covered by this item to civil end-users not engaged in aerospace activities.

1533A Radio spectrum analyzers (i.e. apparatus capable of indicating the single-frequency components of multi-frequency signals), specialized components, accessories and parts therefor, as follows (for spectrum analyzers employing time compression of the input signal or FFT techniques, see entry No. 1529(b)(4)):

(a) * * *

(b) * * *

(c) * * *

(d) Incorporating computing facilities with user accessible reprogramming capability and an alterable memory of more than 8,192 bits;

(e) * * *

(f) * * *

(g) * * *

NOTE: Licenses are likely to be approved for export to bona fide civil end-users for civil end-use of equipment covered by sub-entry (d) above.

1534A Flatbed microdensitometers, *except cathode-ray types,* specially designed parts, components and assemblies therefor, having any of the following characteristics:

(a) A recording or scanning rate exceeding 5,000 data points per second;

(b) A figure of merit better (less) than 0.1, defined as the product of the density resolution (expressed in density units) and the spatial resolution (expressed in micrometers);

(c) An optical density range greater than 0 to 4.

NOTES: 1. Licenses are likely to be approved for export of equipment specially designed for medical applications, provided the equipment is a reasonable requirement for the stated application.

2. Licenses are likely to be approved for export to civil end-users for civil end-uses of equipment covered only by sub-entry (b) above, provided the spatial resolution is not better (less) than 2 micrometers and the density resolution is not better (less) than 0.01 in density units.

1537A Microwave equipment, including parametric amplifiers, capable of operating at frequencies over 1 GHz (other than microwave equipment covered by entries 1501, 1517, 1520, 1526(I), 1529 and Supplement No. 2 to part 370), as follows:

(a) * * *

(b) * * *

(c) Waveguide components, as follows:

(1) * * *

ADVISORY NOTES FOR SELECTED CCL ENTRIES—(Cont.)

Export Control Commodity Number and Commodity Description

1537A (cont.)

(2) * * *

(3) Magnetic including gyro-magnetic waveguide components;

(d) TEM mode device using magnetic including gyro-magnetic properties;

(e) TR and anti-TR tubes and components therefor *except those designed for use in waveguides and having any of the following characteristics, which are in normal civil use for ground or marine radar:*

(i) Operating at a peak power not exceeding 3 MW and at a frequency of 1.5 GHz or less;

(ii) Operating at a peak power not exceeding 1.2 MW and at a frequency over the range of 1.5 GHz to 6 GHz; or

(iii) Operating at a peak power not exceeding 300 kW and at a frequency over the range of 6 GHz to 10.5 GHz;

(f) Assemblies and sub-assemblies in which the isolating base material functions as a dielectric (as used in stripline, microstrip or slotline) except for those items specifically designed for use in civil television systems to meet ITU standards and using as an isolating material paper base phenolics, glass cloth melamine, glass cloth epoxy resin, polyethylene terephthalate or other isolating material with an operating temperature not exceeding 302°F (150°C);

(g) * * *

(h) Microwave assemblies and sub-assemblies having circuits fabricated by the same processes used in integrated circuit technology, which include active circuit elements (for acoustic wave devices, see entry No. 1586) (see also entry No. 1564);

(i) * * *

(j) Amplifiers (see also entry No. 1521);

(k) * * *

(l) * * *

NOTES: 1. Licenses are likely to be approved for export to satisfactory end-users of items covered by sub-entries (c)(3) and (d) above, required as replacement parts in specific civil equipment not exceeding the capability of that which could be exported under entry No. 1501 or entry No. 1520, provided such parts do not upgrade the initial performance of that equipment.

2. Licenses are likely to be approved for export to satisfactory end-users of items covered by sub-entry (e) above required as replacement parts in specific civilian equipment not exceeding the capability of that which could be exported under entry No. 1501, provided such parts do not upgrade the initial performance of that equipment.

3. Licenses are likely to be approved for export to satisfactory end-users of items covered by sub-entry (f) above, designed and intended for use in civil telecommunications systems at frequencies allocated by the ITU for that purpose.

4. Licenses are likely to be approved for export to satisfactory end-users of items covered by sub-entry (h) above, for use at frequencies between 1 GHz and 3 GHz.

5. Licenses are likely to be approved for export to satisfactory end-users of equipment containing parametric amplifying or paramagnetic amplifiers covered by sub-entry (j) above;

(a) Specially designed for medical applications or for use in simple educational devices and operating at ISM frequencies; or

(b) Having an output power of not more than 10 watts, which is specially designed for industrial and civilian intrusion detection and alarm systems, traffic and industrial movement control and counting systems, environmental pollution of air or water detection systems, or for simple educational devices.

ADVISORY NOTES FOR SELECTED CCL ENTRIES—(Cont.)

Export Control Commodity Number and Commodity Description

1541A Cathode-ray tubes having any of the following characteristics:

(a) * * *

(b) With traveling wave or distributed deflection structure using delay lines, or incorporating other techniques to minimize mismatch of fast phenomena signals to the deflection structure; or

(c) * * *

(d) * * *

NOTE: Licenses are likely to be approved for export to satisfactory end-users of cathode-ray tubes covered by sub-entry (b) above, which utilize segmented plate (sectioned Y-plate) structures.

1544A Semi-conductor diodes and dice and wafers therefor (*except those made from germanium, selenium or copper oxide*), designed or rated for use at input or output frequencies above 12.5 GHz or having any of the following characteristics:

(a) (i) * * *

(ii) Schottky diodes designed or rated for mixer use at input or output frequencies of:

(a) 3 GHz or less and having a noise figure of more than 6 dB; or

(b) Greater than 3 GHz and less than 12.5 GHz and having a noise figure of more than 6.5 dB;

(iii) Schottky diodes designed or rated for detector use at input or output frequencies of less than 12.5 GHz and having a minimum rated tangential sensitivity of either worse than −45 dBm under unbiased conditions to worse than −50 dBm under biased conditions;

(b) * * *

(c) * * *

(d) * * *

(e) * * *

(f) Non-coherent light-emitting diodes with a peak radiant intensity at a wavelength of greater than 1,000 nanometers (for coherent light-emitting diodes, see entry No. 1522).

(g) * * *

NOTES: 1. Licenses are likely to be approved for the export to satisfactory end-users of shipments for civil use containing up to 200 of the Schottky diodes mentioned in sub-entries (a)(ii) and (iii) above, having a maximum frequency not exceeding 3 GHz irrespective of noise level or tangential sensitivity.

2. Licenses are likely to be approved for the export to satisfactory end-users of non-coherent light-emitting diodes covered by sub-entry (f) above, for use in identifiable civilian communications systems.

1545A Transistors and dice and wafers therefor (for phototransistors see entry No. 1548) as follows:

(a) * * *

(b) Using silicon as the bulk semi-conductor material and having any of the following characteristics:

(1) * * *

(2) An operating frequency of 1.5 MHz or below and a maximum collector dissipation exceeding 300 watts, or an operating frequency greater than 1.5 MHz and a maximum collector dissipation exceeding 250 watts;

(3) An operating frequency greater than 200 MHz and a product of the operating frequency (in GHz) and the maximum collector dissipation (in watts) exceeding 5;

(4) Majority carrier devices, including but not limited to junction field-effect transistors and metal-oxide semi-conductor transistors, *except field-effect transistors having a maximum power dissipation of 500 mW or less and a maximum operating frequency of 1 GHz or less.*

ADVISORY NOTES FOR SELECTED CCL ENTRIES—(Cont.)

Export Control Commodity Number and Commodity Description

1545A (cont.)

NOTES: 1. Licenses are likely to be approved for export to satisfactory end-users of transistors covered by sub-entries (b)(2) and (3) above, specially designed for television transposers or for civil mobile communication equipment, and having a product of the operating frequency (in GHz) and the maximum collector dissipation (in watts) not exceeding 20.

2. Licenses are likely to be approved for export to satisfactory end-users of transistors covered by sub-entry (b)(4) above which are suitable for and will be used in civil TV, AM or FM receivers or audio frequency equipment.

1547A Thyristors and dice and wafers therefor, as follows:

(a) Designed for use in pulse modulators having a rated turn-on time of less than 1 microsecond where the rated peak current exceeds 150 Amperes;

(b) Having a rated turn-off time of less than 1 microsecond;

(c) Having a rated turn-off time of from 1 microsecond to less than 2.3 microseconds *except those having a rated peak current of 50 Amperes or less and encapsulated in non-hermetically sealed packages;*

(d) Having a rated turn-off time of from 2.3 to 10 microseconds and a figure of merit greater than 25 (the figure of merit is defined as the product of the repetitive peak off-state voltage (V DRM) in kilovolts and the repetitive peak on-state current (I TRM) in Amperes as shown on the thyristor data sheets; and

(e) Specially designed parts and accessories therefor.

NOTES: 1. Licenses are likely to be approved for export to satisfactory end-users of thyristors required as replacement parts in specific civil equipment provided they do not upgrade the initial performance of that equipment.

2. Licenses are likely to be approved for export to satisfactory end-users of thyristors covered by this entry, provided that they have been designed and are intended for civil applications other than in radar or laser modulators.

1548A Photosensitive components and dice and wafers therefor, as follows:

(a) Photosensitive components (including photodiodes, phototransistors, photothyristors, photoconductive cells and similar photosensitive components) with a peak sensitivity at a wavelength longer than 1,200 nanometers or shorter than 190 nanometers);

(b) Semi-conductor photodiodes and phototransistors with a response time constant of 0.25 microsecond or less measured at the operating temperature for which the time constant reaches a minimum.

NOTES: 1. Licenses are likely to be approved for the export to satisfactory end-users of infra-red single-element encapsulated photoconductive cells or pyroelectric detectors intended for civil applications and using any of the following:

(a) Evaporated lead sulphide;

(b) Triglycine sulphate with a surface area of 20 mm^2 or less;

(c) Lead-lanthanum-zirconium titanate ceramic.

2. Licenses are likely to be approved for the export to satisfactory end-users for civil applications of semi-conductor photodiodes covered by sub-entry (b) above, with a response time constant of 0.5 nanosecond or more and with a peak sensitivity at a wavelength neither longer than 920 nanometers nor shorter than 300 nanometers.

1549A Photomultiplier tubes, as follows:

(a) For which the maximum sensitivity occurs at wavelengths longer than 0.75 micrometer or shorter than 0.3 micrometer; or

(b) * * *

(c) * * *

NOTE: Licenses are likely to be approved for export to satisfactory end-users of non-ruggedized tubes covered by sub-entry (a) above, required as replacement parts for specific civil equipment not exceeding the capability of that which could be exported under the Commodity Control List, provided that these parts do not upgrade the initial performance of such equipment.

ADVISORY NOTES FOR SELECTED CCL ENTRIES—(Cont.)

Export Control Commodity Number and Commodity Description

1555A Electron tubes and specialized components and parts therefor, *except commercial standard television camera tubes not having fiber optic faceplates and commercial standard X-ray amplifier tubes,* as follows:

(a) Image intensifiers and image converters incorporating fiber-optic face-plates and/or microchannel-plate electron multipliers, and camera tubes incorporating or coupled with such intensifiers or converters;

(b) Electronic storage tubes, including memory transformers of radar pictures, *except signal converter storage tubes specially designed for television purposes;*

(c) Camera tubes with fiber optic faceplates and/or microchannel-plate electron multipliers;

(d) Ruggedized camera tubes having a maximum length-to-bulb diameter ratio of 5:1 or less.

NOTES: 1. Licenses are likely to be approved for export to satisfactory end-users of reasonable quantities of non-ruggedized tubes covered by this entry, provided that the tubes will be used for bona fide medical applications.

2. Licenses are likely to be approved for export to satisfactory end-users of non-ruggedized direct view storage tubes covered by sub-entry (b) above, having an effective diameter or diagonal not exceeding 280 mm, for civil radar or oscilloscope applications.

3. Licenses are likely to be approved for export to satisfactory end-users of camera tubes covered by sub-entries (c) and (d) incorporating fiber optic faceplates but not microchannel-plate electron multipliers, provided that the tubes will be used for bona fide civil television applications.

1558A Electronic vacuum tubes (valves), and specialized parts, as follows:

(a) Tubes in which space charge control is utilized as the primary functional parameter, including but not limited to triodes and tetrodes, as follows:

(1) Tubes rated for continuous wave operation having either of the following characteristics:

(i) Above 4 GHz at maximum rated anode dissipation; or

(ii) Within the frequency range 0.3 to 4 GHz and for which, under any condition of cooling, the product of the maximum rated anode dissipation (expressed in watts) and the square of the maximum frequency (expressed in GHz) at the maximum rated anode dissipation is greater than 10^4, *except for tubes specially designed for television transmitters operating in the frequency range of 0.47 to 0.96 GHz and rated for operation without a grid current, for which the product of the rated anode dissipation (expressed in watts) and the square of the maximum frequency (expressed in GHz) may reach* 2×10^4;

(2) Tubes rated only for pulse operation having either of the following characteristics:

(i) Above 1 GHz at the peak pulse output power; or

(ii) Between 0.3 and 1 GHz and for which, under any condition of cooling, the product of the peak pulse output power (expressed in watts) and the square of the maximum frequency (expressed in GHz) is greater than 4.5×10^4;

(3) Tubes specially designed for use as pulse modulators for radar or similar applications, having a peak anode voltage rating of 100 kV or more, or rated for a peak pulse power of 6 MW or more (see also entry No. 1514);

(b) Tubes which utilize interaction between a beam of electrons and microwave elements and in which the electrons travel in a direction perpendicular to the applied magnetic field, including but not limited to magnetrons, crossed-field amplifier tubes and crossed-field oscillator tubes, *except:*

(1) *Fixed frequency and tunable pulsed magnetrons and crossed-field amplifier tubes which are in normal civil use in equipment which may be exported under the terms of this List as follows:*

(i) *Magnetrons designed to operate at frequencies below 8 GHz with a maximum rated peak output power of 1.5 MW or less, or between 8 and 12 GHz with the product of the maximum rated peak output power (expressed in kW) and the frequency (expressed in GHz) less than 4,200;*

(ii) *Crossed-field amplifier tubes designed to operate at frequencies below 4 GHz with a maximum rated peak output power of 1.2 MW or less and with less than 15 dB gain;*

ADVISORY NOTES FOR SELECTED CCL ENTRIES—(Cont.)

Export Control Commodity Number and Commodity Description

1558A (cont.)

(2) Fixed frequency continuous wave magnetrons designed for medical use or for industrial heating or cooking purposes operating at a frequency of 2.375 GHz ± 0.05 GHz or 2.45 GHz ± 0.05 GHz with a maximum rated power not exceeding 6 kW or at a frequency lower than 1 GHz with a maximum rated power not exceeding 25 kW;

(c) Tubes which utilize interaction between a beam of electrons and microwave elements or cavities and in which the electrons travel in a direction parallel to the applied magnetic field, including but not limited to klystrons and traveling wave tubes, *except:*

(1) Continuous wave tubes for use in civil communications designed for octave or lesser bandwidth (where the highest operating frequency is equal to or less than two times the lowest operating frequency) having the following characteristics:

(i) Designed to operate below 20 GHz;

(ii) The product of the rated output power (expressed in watts) and the frequency (expressed in GHz) is less than 800;

(2) Pulsed tubes for civil applications designed for octave or less bandwidth and having either of the following characteristics:

(i) Peak saturated output power not exceeding 1 kW and average power not exceeding 40 watts at or below 10 GHz;

(ii) Peak saturated output power not exceeding 100 watts and average power not exceeding 20 watts between 10 and 20 GHz;

(3) Pulsed tubes for civil applications designed for fixed frequency operation at frequencies below 3.5 GHz, peak output power of 1.6 MW or less, and operating bandwidth less than 1 percent;

(4) Low power oscillator tubes designed to operate at frequencies below 20 GHz with maximum output power of less than 3 watts;

(d) * * *

(e) * * *

(f) * * *

(g) * * *

(h) * * *

(i) * * *

NOTE: Licenses are likely to be approved for export to satisfactory end-users of the following:

(a) Tubes covered by sub-entries (a) and (c) above, specially designed for television purposes and which are to be used in television transmitters, the precise location of which is known, for civil telecasting according to CCIR or OIR standards;

(b) Tubes covered by sub-entries (a), (b) and (c) above required as replacement parts for specific civilian equipment not exceeding the capability of that which could be exported under other Commodity Control List entries, provided that these parts do not upgrade the initial performance of that equipment;

(c) Pulsed amplifier klystrons and fixed frequency and mechanically tunable pulsed magnetrons covered by sub-entries (b) and (c) above intended for civil radar equipment previously exported, provided that they do not upgrade the initial performance of that equipment.

1559A Hydrogen thyratrons of ceramic-metal construction rated for a peak pulse power output of 12.5 MW or more; and specially designed parts and accessories therefor.

NOTE: Licenses are likely to be approved for export to satisfactory end-users of ceramic-metal structured hydrogen thyratrons to replace such thyratrons in specific civil radar equipment previously exported, provided that they do not upgrade the initial performance of that equipment.

ADVISORY NOTES FOR SELECTED CCL ENTRIES—(Cont.)

Export Control Commodity Number and Commodity Description

1564A Electronic component assemblies, sub-assemblies, printed circuit boards, and microcircuits:

I. * * *

II. Listed as follows:

(a) Printed circuit boards (single sided, double sided, or multilayer) designed to mount and provide interconnection between electronic components, *except those manufactured from any of the following insulating materials:*

(i) Paper base phenolics;

(ii) Glass cloth melamine;

(iii) Glass epoxy resin;

(iv) Polyethylene terephthalate; or

(v) Any insulating material with a maximum continuous rated operating temperature not exceeding 150° C;

(b) Assemblies, modules and printed circuit boards with mounted components, as follows:

(1) Those including printed circuit boards covered by sub-entry II(a) above;

(2) Those which contain microprocessor, microcomputer or memory microcircuits or embargoed components, *except:*

(i) Assemblies, not containing microprocessor, microcomputer, or memory circuits, whose only embargoed components are capacitors;

(ii) Power supply assemblies;

(c) Microcircuits (monolithic integrated circuits, microprocessor, microcomputer, multichip, hybrid, film or integrated optical types), *except:*

(i) Encapsulated passive networks; or

(ii) Encapsulated micro-circuits which are not designed or rated as radiation hardened, which are not rated for operation below −40°C or above +85°C, which are packaged in TO–5 outline cases (0.305 inch to 0.370 inch diameter) or in non-hermetically sealed cases and which are:

(1) Bipolar types designed for operation as digital logic circuit elements but limited to gates, inverters, buffers, bilateral switches, drivers, counters, latches, adders, comparators, parity generators, multiplexers, expanders, flip-flops, multivibrators, code converters, registers, encoders, decoders, demultiplexers, diode matrices, multipliers and Schmidt-triggers, and having all of the following characteristics:

(a) A product of the typical basic gate propagation delay time (in nanoseconds) and the power dissipation per basic gate (in milliwatts) not less than 30 pJ (i.e. speed-power product/gate not less than 30pJ);

(b) A typical propagation delay time not less than 3 nanoseconds; and

(c) Encapsulated in a package having 24 terminals or less;

(2) CMOS types designed for operation as digital logic circuit elements but limited to gates, inverters, buffers, flip-flops, latches, multivibrators, bilateral switches, display drivers, fixed counters, fixed frequency dividers, storage registers, decoders, voltage translators, encoders, and Schmidt-triggers, and having both of the following characteristics:

(a) A minimum propagation delay time under any rated conditions of not less than 10 nanoseconds;

(b) Encapsulated in a package having 24 terminals or less;

(3) Silicon single-chip microcomputer microcircuits that are mask programmed for a civil application prior to export and having all of the following characteristics:

(a) A word size/speed ratio of less than or equal to a 0.4 bit per microsecond;

ADVISORY NOTES FOR SELECTED CCL ENTRIES—(Cont.)

Export Control Commodity Number and Commodity Description

1564A (cont.)

(b) A speed-power dissipation product of greater than or equal to 4 microjoules;

(c) An on-chip read-only memory (ROM), not including the microcode, of less than or equal to 2,048 bytes;

(d) An on-chip random-access memory (RAM) of less than or equal to 512 bits;

(e) An operand (data) word length of less than or equal to 8 bits;

(f) Not capable of addressing off-chip program memory;

(g) Not rated for operation below −20°C or above +75°C;

(Speed is defined as the time (in microseconds) to add C to D where C and D are both in memory, and put the result back in C.)

(4) Silicon microprocessor microcircuits having all of the following characteristics:

(a) A word size/speed ratio of less than or equal to 0.4 bit per microsecond;

(b) A speed-power dissipation product of greater than or equal to 4 microjoules;

(c) Containing no on-chip ROM or on-chip RAM;

(d) An operand (data) word length of less than or equal to 8 bits;

(e) Capable of addressing off-chip program memory of less than or equal to 32,768 bytes;

(f) Not rated for operation below −20°C or above +75°C;

(5) Memory microcircuits as follows:

(a) MOS dynamic RAM's having all of the following characteristics:

(i) A maximum number of bits per package of 1,024 bits and an access time of no less than 250 nanoseconds;

(ii) Not rated for operation below −20°C or above +75°C;

(b) Mask programmed ROM's not rated for operation below −20°C or above +75°C, as follows:

(i) With a maximum number of bits per package of 2,048 bits and an access time of no less than 450 nanoseconds;

(ii) PMOS or NMOS types with a maximum number of bits per package of 4,096 bits and an access time of no less than 700 nanoseconds;

(c) MOS static RAM's having both of the following characteristics:

(i) A maximum number of bits per package of 256 bits;

(ii) An access time of no less than 450 nanoseconds;

(d) Bipolar RAM's as follows:

(i) With a maximum number of bits per package of 64 bits and an access time of no less than 30 nanoseconds;

(ii) With a maximum number of bits per package of 256 bits and an access time of no less than 40 nanoseconds;

(iii) With a maximum number of bits per package of 1,024 bits and an access time of no less than 45 nanoseconds;

(6) (a) Non-reprogrammable microcircuits, not capable of addressing external memory, specially designed for, and which by virtue of circuit design are normally limited to use only for simple calculators which perform a single function in response to a keystroke,

ADVISORY NOTES FOR SELECTED CCL ENTRIES—(Cont.)

Export Control Commodity Number and Commodity Description

1564A (cont.)

capable of performing a floating point addition of 13 decimal digits (mantissa only) or less in no less than 0.02 second;

(b) Programmable microcircuits specially designed for, and which by virtue of circuit design are normally limited to use only for simple key programmable calculators having both of the following characteristics:

(i) Capable of executing a sequence of no more than 256 program steps introduced into a program memory on the chip by a sequence of keystrokes;

(ii) Capable of performing a floating point addition of 13 decimal digits (mantissa only) or less in no less than 0.02 second;

(c) P-channel or N-channel MOS microcircuits specially designed as, and which by virtue of circuit design are normally limited to use only as, serial digital shift registers with a maximum clock rate of 2.5 MHz, and a maximum number of bits per package of 1,024;

(7) (a) Untuned AC amplifier microcircuits having a bandwidth of less than 3 MHz and a maximum rated power dissipation of 5 watts or less at a case temperature of 25°C;

(b) Audio amplifier microcircuits having a maximum rated continuous power output of 25 watts or less at a case temperature of 25°C;

(8) Operational amplifier microcircuits having all of the following characteristics:

(a) A typical unity-gain open-loop bandwidth of not more than 5 MHz;

(b) A typical open-loop voltage gain of not more than 500,000 or 115 dB;

(c) A maximum intrinsic rated input offset voltage of not less than 2.5 mV; and

(d) A typical slew rate at unity gain not exceeding 2.5 volts/microsecond;

(9) Analog multiplier and/or divider microcircuits having both of the following characteristics:

(a) A best case rated non-linearity of not better than 0.5 percent of full scale;

(b) A −3 dB small-signal bandwidth of not more than 500 kHz;

(10) Isolation amplifier microcircuits;

(11) Instrumentation amplifier microcircuits having all of the following characteristics:

(a) A best case rated non-linearity of not better than 0.02 percent at a gain of 100;

(b) A maximum gain-bandwidth product not greater than 5 MHz (e.g., a maximum bandwidth of 50 kHz at −3 dB and at a gain of 100);

(c) A typical slew rate at unity gain not exceeding 1 volt/microsecond;

(12) Voltage regulator microcircuits, as follows:

(a) Linear types, having both of the following characteristics:

(i) A rated nominal output voltage of 40 volts or less;

(ii) A maximum output current of 1 A or less;

(b) Switching types, having both of the following characteristics:

(i) A rated nominal output voltage of 40 volts or less;

(ii) A maximum output current of 150 mA or less;

(For voltage regulators, the +85°C upper temperature limit specified in II(c)(ii) is not applicable. The lower limit of −40°C is applicable.)

(13) Voltage comparator microcircuits, having both of the following characteristics:

ADVISORY NOTES FOR SELECTED CCL ENTRIES—(Cont.)

Export Control Commodity Number and Commodity Description

1564A (cont.)

(a) A maximum input offset voltage of not less than 2 mV; and

(b) A typical switching speed or typical response time of not less than 30 nanoseconds;

(14) Bipolar microcircuits designed for operation in civil applications as externally controlled (by inductive, magnetic or optical means) electronic switches, or as threshold value switches with switching times of 0.5 microsecond or greater;

(15) Non-coherent light-emitting alphanumeric displays not incorporating an integrated circuit;

(16) Non-coherent light-emitting alphanumeric displays incorporating an integrated circuit used for decoding, controlling and/or driving that display, provided that the integrated circuit is not integral with the actual display device;

(17) Simple encapsulated photo-coupler (transoptor) assemblies with electrical input and output and which incorporate non-coherent light-emitting diodes;

(18) Interface microcircuits, as follows:

(a) Line drivers and line receivers having a typical propagation delay time from data input to output of not less than 15 nanoseconds;

(b) Sense amplifiers, having both of the following characteristics:

(i) A typical propagation delay time from data input to output of not less than 15 nanoseconds;

(ii) A typical input threshold voltage of not less than 10 millivolts;

(c) Memory and clock drivers, having all of the following characteristics:

(i) A maximum rated output current of 500 milliamperes or less;

(ii) A maximum rated output voltage of 30 volts or less;

(iii) A typical propagation delay time from data input to output of not less than 20 nanoseconds;

(d) Peripheral and display drivers, having all of the following characteristics:

(i) A maximum rated output current of 500 milliamperes or less;

(ii) A typical propagation delay time from data input to output of not less than 20 nanoseconds;

(iii) A maximum rated output voltage of 80 volts or less;

(When propagation delay time is not specified, typical turn-on or turn-off time, whichever is less, should be used.)

(19) Voltage-to-frequency converter microcircuits not employing delta or delta/sigma modulation techniques, having both of the following characteristics:

(a) A rated non-linearity of not better than 0.01 percent of full scale;

(b) A settling/response time of not less than 20 microseconds for a full scale input change;

(20) Rms-to-dc voltage converter microcircuits having both of the following characteristics:

(a) A rated conversion accuracy, with or without external adjustment, of not better than 0.2 percent of full scale;

(b) A ± 1 percent amplitude error bandwidth of not greater than 100 kHz;

(21) Analog-to-digital and digital-to-analog converter microcircuits as follows:

(a) Analog-to-digital converter microcircuits having both of the following characteristics:

ADVISORY NOTES FOR SELECTED CCL ENTRIES—(Cont.)

Export Control Commodity Number and Commodity Description

1564A (cont.)

(i) A conversion time to maximum resolution of not less than 20 microseconds;

(ii) A rated non-linearity of not better than 0.05 percent of full scale over the specified operating temperature range;

(b) Digital-to-analog converter microcircuits having both of the following characteristics:

(i) A settling time to rated linearity of not less than 5 microseconds for "voltage output", and not less than 300 nanoseconds for units not incorporating an output amplifier;

(ii) A rated non-linearity of not better than 0.05 percent of full scale over the specified operating temperature range;

(22) Non-reprogrammable microcircuits which are specially designed for and by virtue of circuit design are normally limited to use for functional purposes in the following applications:

(a) Automotive, including safety, comfort, operations and pollution;

(b) Home electronics, including radio and television, appliances, clocks, watches, audio and video tape recorders, safety, comfort and amusement;

(c) Personal communications up to 150 MHz, including amateur radio communications and intercom;

(d) Unembargoed cameras (including cine cameras) but excluding imaging microcircuits;

(e) Cardiac pacemakers;

(A microcircuit whose function cannot be altered by accepting or executing instructions from any external source is non-reprogrammable.)

(Programmed microcircuits are only eligible for export if the program is unalterably stored at the time of manufacture and the performance of the function has been established for the intended end-use.)

(The temperature limits specified in the heading of II(c)(ii) above do not apply to sub-sections II(c)(ii)(22)(a) or (d).)

(23) Timing microcircuits having both of the following characteristics:

(a) A typical timing error of not less than 0.5 percent;

(b) A typical rise time of not less than 100 nanoseconds;

(iii) Unencapsulated monolithic integrated circuits which are not designed or rated as radiation hardened, and which are:

(1) Bipolar types designed for operation as digital logic circuit elements but limited to gates, inverters, buffers, bilateral switches, drivers, counters, latches, adders, comparators, parity generators, multiplexers, expanders, flip-flops, multivibrators, code converters, registers, encoders, decoders, demultiplexers, diode matrices, multipliers and Schmidt-triggers, and having both of the following characteristics:

(a) A product of the typical basic gate propagation delay time (in nanoseconds) and the power dissipation per basic gate (in milliwatts) not less than 70 pJ (i.e., speed-power product/gate not less than 70 pJ);

(b) A typical propagation delay time not less than 5 nanoseconds;

(2) Operational amplifiers, having all of the following characteristics:

(a) A typical unity-gain open-loop bandwidth of not more than 5 MHz;

(b) A typical open-loop voltage gain of not more than 100,000 or 100 dB;

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1564A (cont.)

(c) A maximum intrinsic rated input offset voltage of not less than 5 mV;

(d) A typical slew rate at unity gain not exceeding 1 volt/microsecond;

(3) Audio amplifiers having a maximum rated power output of 10 watts or less at a case temperature of 25°C;

(4) Non-reprogrammable types which are specifically designed for and by virtue of circuit design are normally limited to civil uses in television and radio receivers, having all of the following characteristics:

(a) Rated for operation at 11 MHz or less;

(b) Not specially designed for station scanning applications;

(c) Not utilizing charge-coupled device (CCD) technology;

(d) Not intended for beam lead bonding;

(e) Not intended for video and/or luminance amplifiers with maximum rated supply voltages exceeding 30 volts or with typical bandwidths greater than 7.5 MHz.

NOTES: 1. Licenses are likely to be approved for export to satisfactory end-users for civil applications of assemblies, modules and printed circuit boards with mounted components (excluding those containing microprocessor, microcomputer and memory microcircuits) covered by sub-entry II(b)(2) above, if the components are likely to be approved for export to satisfactory end-users.

2. Licenses are likely to be approved for export to satisfactory end-users of devices covered by sub-entry II(b), and not released by sub-entries II(c)(i) and (ii) above, when they consist of, or are incorporated in, plug-in printed circuit boards or plug-in modules for use in specifically identified equipment previously exported, and which do not upgrade the initial performance of that equipment, provided that the plug-in printed circuit boards or plug-in modules cannot operate independently from the equipment to which they are likely to be connected or inserted.

3. Licenses are likely to be approved for export to satisfactory end-users of integrated circuits covered by sub-entry II(c)(ii) above only by virtue of being encased in hermetically sealed dual-in-line packages, provided that the stated legitimate civil end-use requires such a package.

4. Licenses are likely to be approved for export to satisfactory end-users of devices, encapsulated or unencapsulated, covered by sub-entries II(b) and (c) above, provided the devices have been designed specifically for identifiable civil applications and, by nature of design or performance, are substantially restricted to the particular application for which they have been designed.

1565A Electronic computers and related equipment, as follows:

(a) Analog computers designed or modified for use in airborne vehicles, missiles or space vehicles and rated for continuous operation at temperatures from below −45°C to above +55°C; and equipment or systems incorporating such computers;

(b) Other analog computers capable of accepting, processing and putting out data in the form of one or more continuous variables and capable of incorporating a total of at least 20 summers, integrators, multipliers or function generators with facilities for readily varying the interconnection of these components;

(c) Digital computers and digital differential analyzers (incremental computers), as follows:

(1) Designed or modified for use in airborne vehicles, missiles, or space vehicles and rated for continuous operation at temperatures from below −45°C to above +55°C;

(2) Designed or modified to limit electromagnetic radiation to levels much less than those required to meet appropriate government civil interference specifications;

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1565A (cont.)

(3) Designed as ruggedized equipment and capable of meeting military specifications for ruggedized equipment or modified for military use;

(4) Designed or modified for "data (message) switching" or those incorporating equipment, devices, or techniques, including software, microprogram control (firmware) and/or specialized logic control (hardware), for accepting, storing, processing and retransmitting data groups ("Data (message) switching" is the technique (including but not limited to store and forward or packet switching) for accepting data groups (including messages, packets or other digital or telegraphic information groups that are transmitted as a composite whole), storing (buffering) data groups as necessary, processing part or all of the data groups for control (routing, priority, formatting, code conversion, error control, retransmission or journaling), transmission or multiplexing purposes as necessary, and retransmitting (processed) data groups when transmission and/or receiving facilities are available); and

(5) Equipment or systems incorporating such computers;

(d) Digital computers with one or more of the following characteristics:

(1) Floating point operations are implemented by hardware or microprogram control (firmware);

(2) The computer is equipped with peripherals (other than those free from control under sub-entry (h) below);

(3) The computer is equipped with cathode-ray tube or other displays (other than those free from control under sub-entry (h) below), as follows:

(i) Used to display alphanumeric, graphic and/or similar data or information; or

(ii) With light gun or other graphic input devices;

(e) Other digital computers operated by one or more common control units and capable of all of the following:

(1) Accepting, storing, processing, and producing an output in numerical or alphabetical form;

(2) Storing in fixed or alterable (writable) storage devices more than 512 numerical and/or alphabetical characters or having an internal fixed or alterable memory of more than 2,048 bits;

(3) Performing a stored sequence of operations that are modifiable by means (including replacement of fixed storage devices) other than a physical change in wiring or interconnections; and

(4) Selecting a sequence from a plurality of stored operations based upon data or an internally computed result;

(f) Computers capable of operating both analog and digital modes and related equipment, as follows:

(1) Equipment whose analog portion meets the conditions of sub-entry (b) and whose digital portion meets the conditions of sub-entry (e) and which also provides facilities for processing in the digital section numeric data from the analog section and/or vice versa;

(2) Equipment for interconnecting the analog and digital portions of computers as defined in sub-entry (f)(1); and

(3) Digital or analog computers containing interconnecting equipment as defined in sub-entry (f)(2);

(g) Related equipment for the above (including that also described in entry Nos. 1572 and 1588), designed or modified as described in sub-entry (a) or (c), i.e. specialized parts, components, peripherals, displays, sub assemblies, accessories, and spare parts; and

(h) Other related equipment for the above (including that also described in entry Nos. 1572 and 1588), i.e. specialized parts, components, peripherals, displays, sub-assemblies, accessories, and spare parts.

NOTES: 1. Licenses are likely to be approved for export to satisfactory end-users of analog computers covered by sub-entry (b) above, and related equipment therefore covered by sub-entry (h) above, provided that:

(a) The equipment is primarily used in non-strategic applications;

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1565A (cont.)

(b) The equipment will be used primarily for the specific non-strategic applications for which the export would be approved and that the number, type and characteristics of such equipment are normal for the approved use;

(c) The computers and related equipment are not covered by and would not thereby become covered by sub-entry (a), (f), or (g) above, or exceed the limits of this Note:

(d) The analog computers are limited as follows:

(1) The rated errors for summers, inverters and integrators are not less than

(i) Static : 0.01%

(ii) Total at 1 kHz: 0.15%

(2) The rated errors for multipliers are not less than

(i) Static : 0.025%

(ii) Total at 1 kHz: 0.25%

(3) The rated error for fixed function generators (log x and sine/cosine) is not less than
Static : 0.1%

(4) No more than 350 operational amplifiers; and

(5) No more than four integrator time scales switchable during one program;

Technical Notes:

(1) The percentage for Note 1(d)(1)(i) above applies to the actual output voltage; all other percentages apply to full scale, that is from maximum negative to maximum positive reference voltages.

(2) Total errors at 1 kHz for Note 1(d)(1)(ii) and (2)(ii) above, are to be measured with those resistors incorporated in the inverter, summer or integrator which provide the least error.

(3) Total error measurements include all errors of the unit resulting from, for example, tolerances of resistors and capacitors, tolerances of input and output impedances of amplifiers, the effect of loading, the effects of phase shift, and the generating of functions.

2. Favorable consideration for export to satisfactory end-users of digital computers covered by sub-entry (c)(4) above will depend in part upon the degree of conformity with the following:

(a) The equipment is specially designed to meet the requirements of CCITT recommendation F–31 or ICAO recommendations for civilian aviation communication networks;

(b) The equipment will be used primarily for the specified civil application and will be operated by the civil authorities of the importing country for general civil traffic, or for traffic with links with Western countries, or for an international Service to fulfill a commitment to ITU, ICAO, or any other inter-governmental organization which includes Western countries;

(c) The computers are not covered by the remainder of sub-entry (c) above, or by sub-entries (f) or (g) above, or do not exceed the limits of this Note;

(d) The number, type and characteristics of such equipment are normal for the approved use and that the equipment will be limited as follows:

(1) Suitable combinations of circuits not exceeding:

(i) 250 circuits with "data signaling rates" of less than 150 bits per second;

(ii) 60 circuits with "data signaling rates" of 150 to 1,000 bits per second; and/or

(iii) 8 circuits with "data signaling rates" of greater than 1,000 to 4,800 bits per second;

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1565A (cont.)

(2) The maximum "data signaling rate" of any circuit does not exceed 4,800 bits per second;

(3) The sum of the "data signaling rates" of all circuits does not exceed 27,500 bits per second;

(4) The sum of the "data signaling rates" of all circuits with "data signaling rates" greater than 1,000 bits per second does not exceed 19,200 bits per second;

Technical Note: "Data signaling rate" is as defined in ITU Recommendation 53-36, taking into account that, for non-binary modulation, "bauds" and "bits per second" are not equal. Bits for coding, checking and synchronization functions are to be included.

(e) The disclosure of software and technical information for the equipment exported is held to the minimum necessary for the application, operation and maintenance of the equipment in the stated civil end-use.

3. Favorable consideration for export to satisfactory end-users of digital computers covered by sub-entries (d)(1) or (2), or (e) above, and related equipment therefor covered by sub-entry (h) above, will depend in part upon the degree of conformity with the following:

(a) The equipment is primarily used in "telephone circuit switching" or "telegraph (telex) circuit switching" systems designed for fixed civil applications;

(b) (1) The equipment will be installed in "telephone circuit switching", or "telegraph (telex) circuit switching" systems designed for fixed civil applications;

(2) The equipment in total represents no more than 30 percent of the value of the switching system (during the initial installation of a partially-equipped system, this total may approach 50 percent); and

(3) The switching system will be either:

(i) Operated by civil authorities of the importing country for general civil traffic, or for traffic with links with Western countries, or for an international service to fulfill a commitment to ITU, ICAO or any other inter-governmental organization which includes Western countries; or

(ii) Used in a private exchange or private branch exchange (in each case of no more than 5,000 lines) which will be used in a civil installation situated in a densely-populated industrial area in a proscribed destination, and for which a responsible representative of the end-user or importing agency has furnished a signed statement describing the end-use and the location of the exchange and certifying that the equipment will only be used for that specific end-use;

(c) The computers and related equipment are not covered by and would not thereby become covered by sub-entries (c), (f), or (g) above, or exceed the limits of this Note;

(d) The number, type and characteristics of such equipment are normal for the approved use and that the equipment will be limited to the minimum system configuration necessary to control a 50,000 line exchange for the uses cited in sub-paragraph (b)(3)(i) above, or to control a 5,000 line exchange for the uses cited in sub-paragraph (b)(3)(ii) above;

(e) For the interface equipment with which the digital computer is equipped (to be provided only for administrative and control communications purposes):

(1) The "total effective bit transfer rate" of remote "terminal devices" does not exceed 2,400 bits per second;

(2) The "effective bit transfer rate" of any interfaced "communication channel" does not exceed 2,400 bits per second;

ADVISORY NOTES FOR SELECTED CCL ENTRIES—(Cont.)

Export Control Commodity Number and Commodity Description

1565A (cont.)

(3) The interface equipment is located within the "computer operating area" and limits the "effective bit transfer rate" to those specified in sub-paragraphs (1) and (2) above; and

(4) All interfaced "communication channels" are dedicated full time to the given application;

(f) The disclosure of software and technical information for the equipment exported is held to the minimum necessary for the application, operation and maintenance of the equipment in the stated civil end-use.

Technical Notes:

(1) "Telephone Circuit Switching" is the technique for establishing within an exchange, on demand and until released, an exclusive direct or PCM (CCITT Recommendations G-11, G-732 and G-733) connection between calling and called telephone circuits based solely on subscriber-type of telephone dialing information derived from the calling circuit. The telephone circuits may carry any type of signal, e.g. telephony, telegraph or telex, compatible with a voice channel bandwidth of 3,100 Hz. No information available on the circuit other than the subscriber dialing information is utilized for any other function.

(2) "Telegraph (Telex) Circuit Switching" utilizes techniques essentially identical to "Telephone Circuit Switching" for establishing connections between telegraph (telex) circuits based on the same type of dialing information. The telegraph (telex) circuits (which may be telephone circuits) may carry any telegraph (telex) signal compatible with a voice channel bandwidth of 3,100 Hz or less. No information available on the circuit other than the subscriber dialing information is utilized for any other function.

4. Licenses are likely to be approved for export to satisfactory end-users of digital computers and/or devices covered by sub-entries (d)(1) or (2) or (e) above, and related peripherals covered by sub-entry (h) above, provided that:

(a) The digital computers and/or devices have been designed for identifiable office and personal use and, by nature of design, software, microprogram control (firmware), specialized logic control (hardware) or performance, are substantially restricted to the particular application for which they have been designed;

(b) The digital computers and/or devices and the related peripherals and displays are not covered by sub-entries (c), (f) or (g) above, or do not exceed the limits of this Note;

(c) The digital computers and/or devices are limited as follows:

(1) The "CPU data handling rate" does not exceed 2 million bits per second;

(2) The "CPU numerical processing rate" for units capable of arithmetic operations does not exceed 0.1 million bits per second;

(3) The "total internal memory available to the user" does not exceed 32,768 bits;

(4) For peripheral devices with which the computer is equipped:

(i) No more than one magnetic tape transport which does not exceed:

(a) 1,600 bits per inch per track;

(b) 9 tracks per ½ inch (12.7mm) tape width;

(c) ½ inch (12.7mm) tape width; and

(d) 25 inches (65.6cm) per second tape read/write speed;

(ii) Cassette/cartridge tape drives described in sub-paragraph (d) below;

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1565A (cont.)

(iii) Digital computer peripherals and displays free from control under sub-entry (h) above; and

(iv) Digital recording and reproducing equipment specially designed to use magnetic card, tag, label or bank check recording media free from control under entry No. 1572 sub-entry (a)(*ii*);

(d) The related peripherals are limited as follows:

Cassette/cartridge tape drives operating serially one track at a time, provided they have:

(i) No more than 800 bits per inch per track; and

(ii) No more than 6,000 bits per second maximum bit transfer rate.

Technical Notes:

(1) "CPU data handling rate" is defined as the maximum number of bits that can be accessed in parallel from an internal memory divided by the minimum time (including access time) for the execution of any instruction operating on this number of bits.

(2) "CPU numerical processing rate" is defined as the number of bits used to represent an arithmetic operand divided by the average time required for execution of a multiplication operation, assuming the most efficient arithmetic data coding and the fastest hardware, microprogram control (firmware) and/or software multiplication technique available to the user.

(3) "Total internal memory available to the user" is defined as the sum of the storage capacities of all user-alterable internal storage devices plus all user-replaceable fixed storage devices that may be incorporated in the equipment at one time and that may be used to store microprogram control (firmware) and/or software instructions and data.

5. Licenses are likely to be approved for export to satisfactory end-users of related specialized parts, components, sub-assemblies, accessories and spare parts covered by sub-entry (h) above, for equipment previously exported pursuant to Note 4, provided that:

(a) The related specialized parts, components, sub-assemblies, accessories and spare parts:

(1) Will not upgrade the equipment beyond the limits of Note 4;

(2) Are in reasonable quantities based on the quantity of equipment previously exported from the country; and

(3) Are only for equipment previously exported from the country;

(b) Advanced technology components (microprocessors, arithmetic logic units (ALUs), fixed or alterable storage devices, programmed logic arrays (PLAs), etc.) covered by entry No. 1564 or 1588 are held to the minimum performance and quantity appropriate for the type and quantity of equipment they are intended for, assuming normal usage patterns.

6. Licenses are likely to be approved for export to satisfactory end-users of related specialized parts, components, sub-assemblies, accessories and spare parts covered by sub-entry (h) above, for tape drives previously exported pursuant to Note 4(c)(4)(ii) and (d), provided that they will not upgrade the tape drives beyond the limits of Note 4.

7. Licenses are likely to be approved for export to satisfactory end-users of digital computers covered by sub-entries (d)(1) or (2) or (e) above, and related equipment therefor covered by sub-entry (h) above, provided that:

(a) The equipment is primarily used in non-strategic applications;

(b) The equipment will be used primarily for the specific non-strategic applications for which the export would be approved and that the number, type and characteristics of such equipment are normal for the approved use;

ADVISORY NOTES FOR SELECTED CCL ENTRIES—(Cont.)

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1565A (cont.)

(c) The computers and related equipment are not covered by and would not thereby become covered by sub-entries (c), (f) or (g) above, or exceed the limits of this Note;

(d) The digital computers are limited, as follows:

(1) The sum of either the "I/O bus rate" or the "total effective bit transfer rate", whichever is less, and the "CPU bus rate" does not exceed 45 million bits per second;

(2) The "processing data rate" for CPUs which implement floating point operations by hardware or microprogram control (firmware) does not exceed 8 million bits per second;

(3) The internal memory total connected capacity (excluding parity, word marker and flag bits) does not exceed 2.36 million bits;

(4) For peripheral devices with which the computer is equipped:

(i) The "total effective bit transfer rate" (excluding data channels not equipped with peripheral memory units) does not exceed 8 million bits per second;

(ii) The "effective bit transfer rate" of any peripheral memory or data channel does not exceed 1.6 million bits per second;

(iii) No more than 12 magnetic tape transports;

(iv) Magnetic tape transports which do not exceed:

(a) 1,600 bits per inch per track;

(b) 9 tracks per ½ inch (12.7 mm.) tape width; and

(c) ½ inch (12.7 mm.) tape width;

(v) For peripheral memory devices other than magnetic tape transports:

(a) Total connected "net capacity" does not exceed 960 million bits;

(b) For each independent device with an "average access time" of less than 30 milliseconds, the "memory performance factor" does not exceed 8,000;

(c) For each independent device with an "average access time" of 30 milliseconds or greater, the "memory performance factor" does not exceed 43,000;

(d) "Total number of accesses" does not exceed 150 per second;

(5) The "effective bit transfer rate" of any "terminal device" located remote from the "computer operating area" does not exceed 2,400 bits per second;

(6) For interface equipment with which the computer is equipped:

(i) The "total effective bit transfer rate" (excluding parity, word marker and flag bits) of remote "terminal devices" does not exceed 4,800 bits per second;

(ii) The "effective bit transfer rate" of any interfaced "communication channel" does not exceed 1,200 bits per second;

(iii) The interface equipment is located within the "computer operating area" and limits the "effective bit transfer rates" to those specified in sub-paragraphs (i) and (ii) above; and

(iv) All interfaced "communication channels" are dedicated full time to the given application.

8. Licenses are likely to be approved for export to satisfactory end-users of additional internal memory or peripheral memory devices covered by sub-entry (h) above, for equipment previously exported pursuant to Note 7, provided that:

ADVISORY NOTES FOR SELECTED CCL ENTRIES—(Cont.)

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1565A (cont.)

(a) Two years have elapsed since the initial installation of the equipment;

(b) The equipment would not thereby exceed the limits of Note 7(d) with the following modified limits on internal memory and peripheral memory devices:

(1) The internal memory total connected capacity (excluding parity, word marker and flag bits) does not exceed 4.72 million bits;

(2) For peripheral memory devices other than magnetic tape transports:

(i) Total connected "net capacity" does not exceed 1,400 million bits;

(ii) "Total number of accesses" does not exceed 200 per second;

(c) The conditions of Note 7 continue to be met.

9. Licenses are likely to be approved for export to satisfactory end-users of reasonable quantities of peripherals covered by sub-entry (h) above, as follows:

(a) Disc drives utilizing non-rigid magnetic media, provided they have:

(1) No more than a 7.88 in. (201 mm.) disc;

(2) No more than 3.2 million bit "net capacity";

(3) No more than 250,000 bits per second maximum bit transfer rate; and

(4) No less than 250 millisecond "average access time";

(b) Cassette/cartridge tape drives operating serially one track at a time, provided they have:

(1) No more than 1,600 bits per inch per track;

(2) No more than 48,000 bits per second maximum bit transfer rate;

(c) Non-impact line printers operating at 2,000 lines per minute or less and non-impact character printers operating at 300 characters per second or less;

(d) Graphic displays specially designed for signature security checking having an active display area not exceeding 150 sq.cm.

10. Licenses are likely to be approved for export to satisfactory end-users of additional internal memory and peripheral memory devices covered by sub-entry (h) above, for equipment previously exported, provided that the equipment would not thereby exceed the limits with the following additional limits on peripheral memory devices with which the computer is equipped:

(a) The "effective bit transfer rate" of any peripheral memory or data channel does not exceed 1.6 million bits per second;

(b) For peripheral memory devices other than magnetic tape transports:

(1) Total connected "net capacity" does not exceed 1,900 million bits;

(2) For each independent device with an "average access time" of 30 milliseconds or greater, the "memory performance factor" does not exceed 64,000.

1568A Equipment, as follows:

(a) * * *

(b) * * *

(c) * * *

(d) * * *

ADVISORY NOTES FOR SELECTED CCL ENTRIES—(Cont.)

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1568A (cont.)

(e) * * *

(f) * * *

(g) Precision potentiometers, *except potentiometers using only switched elements* (for the purpose of this sub-entry, a precision potentiometer means one having a rated conformity better than 0.25 percent for a linear potentiometer; or 1 percent for a non-linear potentiometer), and special instruments rated to have the same characteristics as potentiometers in (1) and (2) below, such as Vernistats, as follows:

(1) Linear potentiometers having a constant resolution and a rated linearity of better than 0.05 percent absolute;

(2) Non-linear potentiometers having a variable resolution and a rated conformity of:

(i) 1 percent or less when the resolution is inferior to that obtained with a linear potentiometer of the same type and of the same track length; or

(ii) 0.5 percent or less when the resolution is better than or equal to that obtained with a linear potentiometer of the same type and of the same track length; or

(3) * * *

(h) * * *

(i) * * *

(j) * * *

(k) * * *

(l) * * *

(m) * * *

NOTE: Licenses are likely to be approved for export to bona fide end-users of potentiometers covered by sub-entries (g)(1) and (2) above, provided they have been designed for civil use, and have been in use in civil equipment for a period of not less than five years.

1572A Recording and or reproducing equipment as follows (For equipment which may be exported in conjunction with computer shipments, see entry No. 1565.):

(a) Using magnetic techniques, *except:*

(i) Those specifically designed for voice or music;

(ii) Those specifically designed to use magnetic card, tag, label or bank check recording media with a magnetic surface area not exceeding 10 sq. in. (65 sq. cm.); or

(iii) Digital recording and reproducing equipment operating serially with a packing density not exceeding 800 bits per inch per track specially designed for use with, and incorporated in, typewriter systems used for preparing, correcting and/or composing text;

(b) Using electron beam(s) operating in a vacuum, and or laser-produced light beams (see also entry No. 1522) that produce patterns or images directly on the recording surface, and specialized equipment for image development, *except equipment specifically designed for television recording and/or reproducing on discs;*

(c) Graphic instruments capable of continuous direct recording of sinusoidal waves at frequencies exceeding 20 kHz; and

(d) Specialized parts and components for the above and recording media used in equipment covered by sub-entries (a) and (b). (The term "recording media" is intended to include all types and forms of specialized recording media used in such recording techniques, including but not limited to tapes, drums, discs and matrices.)

ADVISORY NOTES FOR SELECTED CCL ENTRIES—(Cont.)

Export Control Commodity Number and Commodity Description

1572A (cont.)

NOTES: 1. Licenses are likely to be approved for export to satisfactory end-users of reasonable quantities of equipment covered by sub-entry (a) above, and specialized parts, components and recording media therefor covered by sub-entry (d) above, for use with the exported equipment, as follows:

(a) Video magnetic tape recorders, specially designed for television recording, using a signal registered with the C.C.I.R., or specifically designed or adapted for use with medical equipment, and having all of the following characteristics:

(1) 3 dB recording bandwidth not exceeding 6 MHz;

(2) Maximum length of time of a single scan not exceeding 20 milliseconds;

(3) Not ruggedized;

(b) Analog magnetic tape recorders having all of the following characteristics:

(1) Bandwidth capability at maximum design speed not exceeding 100 kHz per track;

(2) Recording density not exceeding 5,000 magnetic flux sine waves per linear inch (25.4 mm) per track;

Technical Note: Recording density is, for direct recorders, the recording bandwidth divided by the tape speed; and, for FM recorders, the sum of the carrier frequency and the deviation divided by the tape speed;

(3) Not ruggedized;

(4) Not rated for continuous operation in ambient temperatures from below −20°C to above +55°C;

(5) Not specifically designed for underwater use;

(6) Not including recording and/or reproducing heads of the rotary or floating types or designed for use in equipment with characteristics superior to those designed in subparagraph (b)(1) and (2) above;

(7) Tape speed not exceeding 60 inches (152.4 cm) per second;

(8) Number of recording tracks (excluding audio voice track) not exceeding 16;

(9) Start-stop time not less than 25 milliseconds;

(10) Equipped with tape-derived (off-tape) servo speed control and with a time displacement (base) error of not less than ±25 microseconds at a tape speed of 60 inches (152.4 cm) per second and not less than ±50 microseconds at any lower tape speed measured in accordance with IRIG document 118–71, paragraph 5.2.2.5, or document EIA RS–413/ANSI C 83.94–1973;

(c) Systems for use in civil aircraft or helicopters to record flight data for safety and/or maintenance purposes, and having all of the following characteristics:

(i) In normal civil use for more than one year;

(ii) Not exceeding 100 input channels;

(iii) Sum of the individual channel recording bandwidths not exceeding 500 Hz;

(d) Recording equipment not intended for use in conjunction with equipment or materials covered by other items, provided that the capability of the recorder is limited to both:

(1) A tape width not exceeding ¼ inch (6.35 mm);

(2) Digital recording techniques in serial form with a packing density not exceeding 800 bits per inch.

ADVISORY NOTES FOR SELECTED CCL ENTRIES—(Cont.)

Export Control Commodity Number and Commodity Description

1572A (cont.)

Technical Note: Packing density is, for digital recorders, the number of bits per second per track divided by the tape speed;

(e) Incremental recorders and/or reproducers (i.e. equipment designed for discontinuous sampling and or collection of data in an incremental manner) having all of the following characteristics:

(1) The maximum tape speed, at the maximum stepping rate, does not exceed 2 inches (50.8 mm) per second;

(2) The equipment has all the characteristics specified in sub-paragraphs (3) to (6) inclusive in Note 1(b) above;

(f) Digital magnetic recorders specially designed for seismic/geophysical applications, operating in the frequency range of 5 to 800 Hz and limited to the following operational parameters:

(1) A maximum bit packing density of 1,600 bits per inch (63 bits per mm) per track;

(2) A maximum bit transfer rate of 0.96 million bits per second;

(3) A maximum tape read-write speed of 75 inches (190.5 cm) per second.

Technical Note: Packing density is, for digital recorders, the number of bits per second per track divided by the tape speed.

2. Licenses are likely to be approved for export to satisfactory end-users of reasonable quantities of magnetic tape and flexible disc cartridge recording media covered by sub-entry (d) above, for use in civil television recording and reproducing applications or with computers as appropriate, provided that:

(a) The base material consists only of polyethylene terephthalate or cellulose acetate;

(b) The magnetic coating material consists only of undoped gamma-ferric (iron) oxide with a rated intrinsic coercitivity not exceeding 350 oersteds (video tape considered under sub-paragraph (c)(1) below, may also include chromium dioxide-coated tape with a rated intrinsic coercitivity not exceedng 500 oersteds and a width not exceeding 1 inch (25.4 mm)); and

(c) The magnetic recording media is limited to the following types and characteristics:

(1) Video tape designed for television recording and reproduction with a tape width not exceeding 2 inches (50.8 mm);

(2) Computer tape designed for digital longitudinal recording and reproduction and having all of the following characteristics:

(i) A magnetic coating certified for a maximum packing density of 6,250 bits per inch (9,042 flux changes per inch) along the length of the tape;

(ii) A magnetic coating thickness not less than 0.40 mil (10.2 microns);

(iii) A tape width not exceeding 1 inch (25.4 mm);

(iv) A tape length not exceeding 3,600 feet (1,097.3 meters);

(3) Computer tape in cassettes/cartridges designed for digital longitudinal recording and reproduction and having all of the following characteristics:

(i) A magnetic coating certified for a maximum packing density of 1,600 bits per inch (3,200 flux changes per inch) along the length of the tape;

(ii) A magnetic coating thickness not less than 0.17 mil (4.32 microns);

(iii) A tape width not exceeding ¼ inch (6.35 mm);

ADVISORY NOTES FOR SELECTED CCL ENTRIES—(Cont.)

Export Control Commodity Number and Commodity Description

1572A (cont.)

(iv) A tape length not exceeding 900 feet (274.3 meters);

(4) Computer flexible disc cartridges designed for digital recording and reproduction and having all of the following characteristics:

(i) A magnetic coating certified for a maximum packing density of 13,262 flux changes per radian (3,268 bits per inch at a radius of 2.029 inches (51.536 mm)) around the disc;

(ii) A magnetic coating thickness not less than 0.1 mil (2.54 microns);

(iii) A disc thickness not exceeding 0.003 inch (80 microns);

(iv) A disc outer diameter not exceeding 7.88 inches (201 mm);

(v) A disc inner diameter of 1.5 inch (38.1 mm).

3. Licenses are likely to be approved for export to satisfactory end-users of reasonable quantities of recording media covered by sub-entry (d) above, specially designed for digital recording and reproducing equipment operating serially with a packing density not exceeding 800 bits per inch per track specially designed for use with, and incorporated in, typewriter systems used for preparing, correcting and/or composing text. (The digital recording and reproducing equipment described in this Note is not covered by sub-entry (a) above.)

1584A Cathode-ray oscilloscopes and specialized parts therefor, including associated plug-in units and external amplifiers, preamplifiers, and sampling devices, having any of the following characteristics:

(a) An amplifier bandwidth greater than 100 MHz (defined as the band of frequencies over which the deflection on the cathode-ray tube does not fall below 70.7 percent of that at maximum point measured with a constant input voltage to the amplifier);

(b) Containing or designed for use with cathode-ray tubes covered by entry 1541(b) or (c);

(c) * * *

(d) * * *

(e) * * *

(f) * * *

NOTE: Licenses are likely to be approved for export to satisfactory end-users of oscilloscopes (including mainframe/amplifier systems) and probes therefor, covered only by sub-entries (a) and (b) above, provided that:

(a) The oscilloscope or system bandwidth is not rated in excess of 200 MHz;

(b) In the case of systems, the characteristics of individual plug-ins or mainframes are not in excess of what is required for the overall system performance;

(c) The equipment is a reasonable requirement for the stated legitimate civil end-use; and

(d) The cathode-ray tube contains no electron multiplier.

1586A Acoustic wave devices and specialized parts therefor, as follows:

(a) Surface acoustic wave and surface skimming acoustic wave devices (*i.e.*, signal processing devices employing elastic waves in materials, including but not limited to, lithium niobate, lithium tantalate, bismuth germanium oxide, silicon, quartz, yttrium garnet, aluminium oxide and magnesium aluminium oxide) which permit direct processing of signals, including but not limited to, amplifiers, correlators (fixed, programmable and memory), oscillators, bandpass filters (transversal and resonator), multiplexers, dispersive expansion and compression filters, delay lines (fixed and tapped) and non-linear devices, having any of the following characteristics:

ADVISORY NOTES FOR SELECTED CCL ENTRIES—(Cont.)

Export Control Commodity Number and Commodity Description

1586A (cont.)

(1) A carrier frequency of greater than 400 MHz;

(2) * * *

(b) * * *

NOTE: Licenses are likely to be approved for export to satisfactory end-users of devices covered by sub-entry (a)(1) above, which are specially designed for use in civil television equipment and which operate at frequencies below 1 GHz.

1587A Quartz crystals and assemblies thereof in any stage of fabrication (i.e. worked, semi-finished or mounted), *except optical grade quartz crystals*, as follows:

(a) For use as filter elements, and having either of the following characteristics:

(1) Designed for operation over a temperature range wider than 125°C; or

(2) Crystals or assemblies of crystals which use the trapped energy phenomenon (i.e. those which have more than one series or parallel resonance on a single quartz element);

(b) * * *

(c) * * *

NOTE: Licenses are likely to be approved for export to satisfactory end-users of items covered by sub-entry (a) above, which have either of the following characteristics:

(a) Designed for operation as intermediate frequency filters operating from 10.5 to 11 MHz or from 21 to 22 MHz with 3 dB bandwidths not exceeding 40 kHz; or

(b) Designed for operation as single sideband filters operating at from 1 to 10 MHz with 3 dB bandwidths not exceeding 4 kHz.

1588A Materials composed of crystals having spinel, hexagonal, orthorhombic or garnet crystal structures; thin film devices; assemblies of the foregoing; and devices containing them, as follows (for equipment which may be exported in conjunction with computer shipments, see entry No. 1565):

(a) * * *

(b) Single aperture forms possessing either of the following characteristics:

(1) Switching speed of 0.3 microsecond or faster at the minimum field strength required for switching at 104°F (40°C); or

(2) A maximum dimension less than 30 mils (0.76 mm);

(c) * * *

(d) * * *

(e) * * *

(f) * * *

(g) * * *

NOTE: Licenses are likely to be approved for export to satisfactory end-users of single aperture forms covered by sub-entry (b) above, provided they have a switching speed of slower than 0.3 microsecond and a maximum dimension of 14 mils (0.36 mm) or more.

1595A Gravity meters (gravimeters), and specialized parts therefor, designed or modified for airborne or marine use.

NOTE: Licenses are likely to be approved for export to civil end-users for civil end-uses of marine gravimetric systems having a static accuracy of 1 milligal or above, or an in-service (operational) accuracy of 1 milligal or above with a time to steady-state registration of two minutes or greater under any combination of attendant corrective compensations and motional influences.

ADVISORY NOTES FOR SELECTED CCL ENTRIES—(Cont.)

Export Control Commodity Number and Commodity Description

3604A Zirconium metal; alloys containing more than 50% zirconium by weight; and compounds in which the ratio of hafnium content to zirconium content is less than one part to five hundred parts by weight; manufactures wholly thereof; *except*

(i) Zirconium metal and alloy in shipments of 5 kg or less;

(ii) Zirconium in the form of foil or strip having a thickness not exceeding 0.025 mm (0.00095 in.) and specially fabricated and intended for use in photo flash bulbs, in shipments of 200 kg or less.

NOTE: Licenses are likely to be approved for export to satisfactory end-users of:

(a) Finished parts made of zirconium metal or alloys, specially designed for an identified civil research or power reactor, such as cladding tubes and plugs and separators therefor, liner tubes, thermal insulating tubes, pressure tubes and calandria tubes, provided that:

(1) None of the parts contains fissile materials; and

(2) The importing country has agreed to the application of the Safeguards of the International Atomic Energy Agency (IAEA) in connection with the nuclear reactor facility;

(b) Contained zirconium metal, or parts made therefrom, in individual shipments not exceeding 100 kg, when intended for use in, or in support of, an identified civil research or power reactor facility, in connection with which it is contemplated that IAEA Safeguards would be applied.

3605A Nickel powder and porous nickel metal, as follows:

(a) Powder with a nickel content of 99 percent or more, and a particle size of less than 100 micrometers; and

(b) * * *

NOTE: Licenses are likely to be approved for export to satisfactory end-users of:

(a) Nickel powder in uncompacted powder form not made by the carbonyl process; or

(b) Nickel powder in uncompacted powder form made by the carbonyl process, in quantities of 50 kg or less.

1673A Artificial graphite having an apparent relative density of 1.90 or greater when compared with water at 60°F (15.50°C), *except artificial graphite which has been impregnated or composited with inorganic materials for the purpose of improving only its electrical conductivity, its mechanical resistance or its mechanical friction properties; and electrical resistors, artificial loads for microwave applications, cable waveguide terminations, brush stock, special joints for electrodes, boats and crucibles and high density graphite optical elements.*

NOTE: Licenses are likely to be approved for export to satisfactory end-users of the following:

(a) Pyrolitic graphite (e.g. graphite made by vapor deposition at temperatures exceeding 2,732°F. (1,500°C)) in crude or semi-fabricated forms, the dimension of any one of which does not exceed 4 inches (10 cm) in any direction, in individual shipments not exceeding 55 pounds (25 kg);

(b) Non-pyrolitic graphite, having a relative density of less than 1.95 which has not been coated or composited with other elements or compounds to improve its performance at elevated temperatures or reduce its permeability to gases.

1754A Fluorocarbon compounds and manufactures, as follows:

(a) Monomeric and polymeric materials, as follows:

(1) Polychlorotrifluoroethylene, oily and waxy modifications only;

(2) * * *

(3) * * *

(4) * * *

(5) * * *

(b) Greases, lubricants and dielectric, damping and flotation fluids made wholly of any of the materials in sub-entry (a) above;

(c) * * *

ADVISORY NOTES FOR SELECTED CCL ENTRIES—(Cont.)

Export Control Commodity Number and Commodity Description

1754A (cont.)

NOTE: Licenses are likely to be approved for export to satisfactory end-users of up to 5 US gallons (18.9 liters) of polychlorotrifluoroethylene-based lubricating oils covered jointly by sub-entries (a)(1) and (b) above, for bona fide civil uses.

1755A Silicone fluids and greases, as follows:

(a) * * *

(b) Silicone lubricating grease capable of operating at temperatures of 356°F (180°C) or higher and having a drop point (method of test being ASTM or ITP) of 428°F (220°C) or higher.

NOTE: Licenses are likely to be approved for export to satisfactory end-users of silicone lubricating greases covered by sub-entry (b) above, provided they are not capable of operating at temperatures of 400°F (205°C) or higher.

1763A Fibrous and filamentary materials which may be used in composite structures or laminates and manufactures thereof, as follows:

(a) Having both of the following characteristics:

(1) Specific modulus greater than 1.25 x 10^6, and

(2) Specific tensile strength greater than 3 x 10^6;

(b) Having both of the following characteristics:

(1) Specific modulus greater than 1 x 10^6, and

(2) Melting or sublimation point higher than 3,000°F (1,649°C) in an inert environment; *except carbon fibers having a specific modulus of less than 2 x 10^6 and a specific tensile strength of less than 1 x 10^6;*

(c) * * *

NOTE: Licenses are likely to be approved for export for bona fide civil end-uses, of carbon fibers covered by sub-entries (a) and (b) above having both of the following characteristics:

(a) Specific modulus less than 4.5 x 10^6, and

(b) Specific tensile strength less than 4 x 10^6.

1767A Preforms of glass or any other material specially designed for the fabrication of optical transmission fibers intended for the manufacture of cable covered by entry No. 1526 II(c).

NOTE: Licenses are likely to be approved for export to satisfactory end-users of the preforms described in this entry.

This material will not appear in 15 CFR Part 399.

PART 399

COMMODITY CONTROL LIST AND RELATED MATTERS

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[1] § 399.2 does not appear in this document.

§ 399.1

THE COMMODITY CONTROL LIST AND HOW TO USE IT

(a) Commodity Coverage

The Commodity Control List (CCL) includes all commodities except those specifically controlled for export by another department or agency of the U.S. Government. For example, arms, ammunition, and implements of war are controlled for export by the Office of Munitions Control, U.S. Department of State. See § 370.10 for a listing of exports controlled by other U.S. Government departments and agencies.

(b) Commodity Categories

The commodities under OEA jurisdiction are grouped on the CCL under 10 general categories. Each CCL entry is preceded by a four-digit Export Control Commodity Number (ECCN). The first digit relates to the strategic level of control; the second digit identifies the Group to which the commodity belongs; and the remaining two digits identify related commodities within a Group.

Group	*Types of Commodities*
0	Metal-working machinery
1	Chemical and petroleum equipment
2	Electrical and power-generating equipment
3	General industrial equipment
4	Transportation equipment
5	Electronics and precision instruments
6	Metals, minerals, and their manufactures
7	Chemicals, metalloids, petroleum products, and related materials
8	Rubber and rubber products
9	Miscellaneous

Within the ten general categories, specific CCL entries define the commodities under control to the destinations included in the country groups specified in the CCL column headed "Validated License Required." See Supplement No. 1 to Part 370 for a listing of the countries included in each country group.

(c) Embargo Destinations

Almost all CCL entries include Country Groups S and Z, embargo destinations, in the column headed "Validated License Required." Generally, the last entry in each commodity category is a "basket" entry asserting control over exports to destinations in Country Groups S and Z of commodities that are not elsewhere specified in that commodity category. In a few instances, however, certain entries are excepted from the general embargo policy and are specifically identified. The commodities so excepted may be exported under General License *G-DEST*. Certain other General Licenses may also apply, *e.g.*, General License *GIFT*. With these exceptions, no commodity may be exported or reexported to a destination in Country Group S or Z unless an export license application (Form ITA-622P) or request to reexport (Form ITA-699P) has been filed with the Office of Export Administration and a validated export license or reexport approval covering the proposed transaction has been issued to the exporter. See § 385.1 for general policy statements with respect to embargo destinations.

(d) All Other Destinations, except Canada

If a commodity is intended for export to a destination in Country Group P, Q, T, V, W, or Y and is covered by a CCL entry that includes P, Q, T, V, W, or Y, as appropriate, in the column headed "Validated License Required," an export license application or reexport request will generally have to be filed with the OEA and a validated export license or reexport authorization covering the proposed transaction will generally have to be issued prior to shipment. If a commodity is covered by a CCL entry but is intended for export to a country that is *not* included in a country group for which control is indicated, the commodity may be shipped under authority of General License *G-DEST*, provided none of the parties involved is currently denied export privileges (see Supplement No. 1 to Part 388) and the export is not restricted by the special licensing requirements summarized in (f)(3) below. A small value shipment of a commodity included in a CCL entry

may be eligible for export to a destination in Country Group Q, T, or V under the authority of General License *GLV*. In addition, one of the other, more specialized, General Licenses set forth in Part 371 may be applicable. Exporters should review the General License provisions in Part 371 prior to filing an application to ascertain whether any apply to the proposed shipment or conversely require a validated license.

(e) Canada

Canada is not included in any of the Country Groups, and most commodities may be exported to Canada for consumption or use in that country without a validated export license. In the few instances where a validated license is required, Canada is specifically named. See § 385.6 for a general policy statement with respect to exports to Canada. Note also the special licensing requirements summarized in (f)(3) below.

(f) How to Use the CCL

(1) General categories.

The first step is to identify which CCL entry covers the commodity proposed for export. This can usually be determined by reviewing the appropriate general category within which the commodity is most likely to be included. If the exporter is uncertain of the proper CCL entry, he should consult the Office of Export Administration.

Once the CCL entry has been located, the Export Control Commodity Number (ECCN) should be noted. This consists of a four-digit number that must appear on your export license application or reexport request, if one is required. The four-digit number will be followed by a code letter. This code letter is a key to the documentation requirements of Part 375, and is used elsewhere in the Regulations to indicate the country group level of control for CCL entries. This code letter need not appear on the export license application or reexport request. The letters used and the respective country groups are:

Code Letters	*Country Groups for Which Validated License is Required*
A	PQSTVWYZ (Multilaterally controlled to all destinations.)
	Only "A" commodities are subject to IC/DV procedure (see § 375.1).
B	PQSTVWYZ (Unilaterally controlled to all destinations.)
C	PQSWYZ and certain other countries.
D	PQSWYZ only.
E	PSWYZ.
F	SZ and certain other countries.
G	SZ only.
I	None.
M	Various (Country Group control level is governed by another entry on the CCL.)

(2) Country of destination and value of shipment.

Having located the ECCN for a commodity that is to be exported, the next step is to determine if a validated export license is required for *the particular shipment* in question. This is determined by reference to the column of the CCL headed "Validated License Required" and, in certain cases, by the value of the shipment.

(i) If the code letter following the ECCN is A or B, and the country of destination is in Country Group T or V, a validated export license is required if the value of the shipment exceeds the value shown in the column of the CCL headed "GLV $ Value Limit." However, see § 371.5 for restrictions on the use of General License *GLV*.

(ii) If the code letter following the ECCN is A and the country of destination is in Country Group P, Q, S, W, Y, or Z, a validated export license is required *regardless of the value of the shipment.*

(iii) If the code letter following the ECCN is B, C, D, or E, and the country of destination is in Country Group P, S, W, Y or Z or specifically named in the column of the CCL headed "Validated License Required," a validated export license *is* required, regardless of the value of the shipment. If the country of destination is in Country Group Q, a validated export license is required unless the code letter is E, F, G or I, or there is a GLV

$ value shown in a footnote to the entry and the value of the shipment does not exceed the GLV $ value. The GLV $ value limit for Country Group Q is "0" unless stated otherwise in a footnote for the entry. However, see § 371.5 for restrictions on the use of General License *GLV*.

(iv) If the code letter following the ECCN is F or G, and the country of destination is in Country Group S or Z or is specifically named in the column of the CCL headed "Validated License Required," a validated export license *is* required, regardless of the value of the shipment.

(3) Special licensing requirements.

Under certain circumstances, a commodity may not be exported under a General License even though, from an examination of the CCL, it appears to meet the requirements for export under a General License. Exporters should review, in particular, Parts 376, 378, and 385. For example—

(i) The commodity is related to nuclear weapons, nuclear explosive devices, nuclear testing, the chemical processing of irradiated special nuclear or source material, the production of heavy water, the separation of isotopes of source and special nuclear material, or the fabrication of nuclear reactor fuel containing plutonium, as described in § 378.3, or the technical data are related to any of these activities, as described in § 379.4(c)(1), unless the technical data may be exported under the provisions of General License *GTDA;*

(ii) An individual validated export license is required to export any commodity or technical data (except data meeting the conditions of General License *GTDA*) where the exporter knows or has reason to know that the commodity, the data, or any product of the data, will be sold to or used by or for military or police entities in the Republic of South Africa or Namibia. See also § 385.4 with respect to controls over other commodities for export to the Republic of South Africa or Namibia.

(g) Commodity Control List Headings

The Commodity Control List contains two headings designed to inform applicants of information that must be included on an export license application or reexport request, and one heading to inform applicants of the reason for control of the commodity.

(1) Unit of quantity.

The quantity classification given for each commodity in the "Unit" column of the CCL must be shown on the export license application. If dashes (---) are shown in this column, the license is issued in terms of dollar value, unless a specific unit of quantity is required by a footnote in this column. However, if another unit of quantity is commonly used in the trade, the application should show the quantity in terms of that unit. If a unit of weight or measure is listed in the unit column, a shipping tolerance is allowed. (See § 386.7.)

(2) Processing code.

For each entry on the Commodity Control List, a processing code, *i.e.*, CD, EE, MG, or SS, appears in the "Processing Code" column. These processing codes must be shown on the application for export license or reexport request, since they are used to facilitate the routing and processing of export license applications within the Office of Export Administration. These processing codes stand for Computer Division (CD), Electronic Equipment Division (EE), Capital Goods and Production Material Division (MG), and Short Supply Division (SS). Only those entries on the CCL that have the same processing code may be entered on a single application for export license. (For complete information on the inclusion of related commodities on a single application, see § 372.4 (d).)

(3) Reason for control.

The reason for control for each entry is specified in the last column [1], using the following number code—

[1] In accordance with section 5(c)(1) and 6(k) of the Export Administration Act of 1979.

Code Number	*Reason for Control*
1	National security [1]
2	Short supply [2]
3	Foreign policy [3]
4	Nuclear non-proliferation [4]
5	Crime control (foreign policy) [5]

In some cases, more than one reason for control is given for one entry. If an entry is controlled for more than one reason, but not to an identical list of countries, the lesser degree of control is explained in a footnote. Also, all entries (except those showing "none" in the "Validated License Required" column) are controlled for foreign policy reasons to Country Groups S and Z due to certain embargo programs, and all entries having both a "V" in the "Validated License Required column and a "1" in the "Reason for Control" column are controlled for foreign policy reasons to Syria, Iraq, Libya, and the People's Democratic Republic of Yemen. In some cases, sub-entries of a CCL entry are controlled for different reasons. In these cases, a dash (—) will be shown in the first line of the entry, and the code number is shown in the "Reason for Control" column exactly opposite each sub-entry (a), (b), etc. (For example, see CCL entry No. 1110.) In some cases, portions of one entry are controlled, rather than the entire entry, for a certain reason. In these cases, a dash (—) will be shown in the first line of the entry, and the Code Number designating control is shown (in the "Reason for Control" column) exactly opposite each sub-entry (a), (b), etc.

(h) The Abbreviation "n.e.s."

The abbreviation "n.e.s." appearing in various CCL entries means "not elsewhere specified." If a commodity intended for export appears to be covered by a CCL entry and the commodity description carries the limitation "n.e.s.," that CCL entry should not be used until a check has been made to determine whether another CCL entry specifically covers the commodity.

(i) Commodity Description on Applications or Reexport Requests

Phrases such as "specify by name," "specify by name and model number," "give full specifications," etc., are included in various CCL entries. This information is required by the OEA on export license applications or reexport requests in order to evaluate the proposed export. Failure to provide the requested information may delay processing or result in the application or reexport request being returned without action.

(j) Commodity Groups

Export control commodity classifications are divided into major groups of related commodities. Below are the titles appearing on the Commodity Control List and initial page number of each group.

(k) Control Over End Products

Certain commodities that are under export control to all destinations for national security reasons may be used as components in end products that, because of their peaceful use, are under control only to embargo destinations. Where a controlled component is the principal element in such an end product, however, and can feasibly be removed or used for other purposes, the object of the control program is defeated unless the end product is subject to the same control as the component. This explains why, in some instances, commodities that do not appear to qualify for control for national security reasons are under validated license control to all destinations.

NOTE

The foregoing portion of this § 399.1 is explanatory only and does not modify or supersede other Parts of the *Export Administration Regulations.*

[1] Export Administration Act of 1979, Section 5, Pub. L. 96-72, 93 Stat. 507, to be codified at 50 U.S.C. app. § 2404.

[2] Export Administration Act of 1979, Section 7, Pub. L. 96-72, 93 Stat. 515, to be codified at 50 U.S.C. app. § 2406. Other statutes controlling petroleum and other commodities include: Energy Policy and Conservation Act, Section 103, Pub. L. 94-163, 89 Stat. 877, 42 U.S.C. § 6212; Trans-Alaska Pipeline Authorization Act, Section 101, Pub. L. 93-153, 87 Stat. 576, amending 30 U.S.C. § 185; Naval Petroleum Reserves Production Act of 1976, Section 201(10), Pub. L. 94-258, 90 Stat. 309, amending 10 U.S.C. § 7430.

[3] Export Administration Act of 1979, Section 6, Pub. L. 96-72, 93 Stat. 513, to be codified at 50 U.S.C. app. § 2405.

[4] Export Administration Act of 1979, Sections 5, 6, and 17(d), Pub. L. 96-72, 93 Stat. 507, to be codified at 50 U.S.C. app. § 2416(d), Nuclear Non-Proliferation Act of 1978, Section 309(c), Pub. L. 95-242, 92 Stat. 141, to be codified at 42 U.S.C. § 2139a.

[5] Export Administration Act of 1979, Section 6(j), Pub. L. 96-72, 93 Stat. 515, to be codified at 50 U.S.C. app. § 2405(j).

Commodity Group Number	Commodity Groups	Commodity Control List Page No.
0	Metal-Working Machinery	CCL-1
1	Chemical and Petroleum Equipment	CCL-5
2	Electrical and Power-Generating Equipment	CCL-8
3	General Industrial Equipment	CCL-10
4	Transportation Equipment	CCL-21
5	Electronics and Precision Instruments	CCL-25
6	Metals, Minerals, and Their Manufactures	CCL-66
7	Chemicals, Metalloids, Petroleum Products and Related Materials	CCL-70
8	Rubber and Rubber Products	CCL-77
9	Miscellaneous	CCL-78

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control

GROUP O—METAL-WORKING MACHINERY [1]

2018A	Specialized machinery, equipment, gear, and specially designed parts and accessories therefor, specially designed for the examination, manufacture, testing, and checking of the arms, ammunition, appliances, machines, and implements of war.	-------[2]	PQSTVWYZ	0[3]	MG	1, 3, 5

The following is an illustrative list of specialized machinery, equipment, and gear covered by this entry:

Machines and machine tools and implements or accessories, metal cutting and working, of the following description:

Armor plate drilling machines, other than radial drilling machines
Armor plate planing machines
Armor plate quenching presses
Artillery casting machines
Centrifugal casting machines capable of casting tubes 6 feet (183 cm) or more in length, with a wall thickness of 2 inches (5 cm) and over
Gun barrel rifling and broaching machines, and tools therefor
Gun barrel rifling machines
Gun barrel trepanning machines
Gun boring and turning machines
Gun honing machines of 6 foot (183 cm) stroke or more
Gun jump screw lathes
Gun rifling machines
Gun straightening presses
Induction hardening machines for tank turret rings and sprockets
Jigs and fixtures and other metal-working implements or accessories of the kinds exclusively designed for use in the manufacture of ammunition, firearms, ordnance, and other stores and appliances for land, sea, or aerial warfare
Small arms chambering machines
Small arms deep hole drilling machines and drills therefor
Small arms rifling machines
Small arms spill boring machines
Tank turret bearing grinding machines

1072A	Now covered by entry No. 1312.					
1075A	Spin-forming and flow-forming machines, double support or three roller types, as follows: (a) Horizontal spindle type designed to have or having a drive motor of 80 hp (59kW) or more; (b) Vertical spindle type designed to have or having a drive motor of 50 hp (37kW) or more; and (c) Specially designed parts and accessories therefor.	-------[2]	PQSTVWYZ	1,000	MG	1, 4
1080A	Machines and equipment, including specialized tooling and fixtures, and specially designed parts and accessories therefor, specially designed for making or measuring gas turbine blades and/or vanes, *including but not limited to* the following: (a) Blade and/or vane belt grinding machines; (b) Blade and/or vane edge radiusing machines; (c) Blade and/or vane aerofoil milling and/or grinding machines;	-------[2]	PQSTVWYZ	1,000	MG	1

[1] See § 370.10 for commodities which require export authorization from other U.S. Government Departments and Agencies.
[2] Report machines in "number."
[3] The GLV $ value limit for the following countries is $500: Australia, Belgium, Denmark, France, the Federal Republic of Germany (including West Berlin), Greece, Iceland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Turkey and the United Kingdom.

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits TSR	Processing Code	Reason for Control

Entry No. 1080 (cont.)

(d) Blade and/or vane blank pre-forming machines;
(e) Blade and/or vane rolling machines;
(f) Blade and/or vane aerofoil shaping machines, *except metal removing type;*
(g) Blade and/or vane root grinding machines;
(h) Blade and/or vane aerofoil scribing equipment;
(i) Blade and/or vane aerofoil and/or root automatic measuring equipment;
(j) Precision vacuum investment casting equipment;
(k) Small hole drilling equipment for producing holes less than 0.030 inch (0.76 mm) in diameter;
(l) Directional solidification casting equipment;
(m) Segmented cast blade and/or vane bonding equipment;
(n) Integral blade-and-disc casting equipment;
(o) Blade and/or vane coating equipment;
(p) Ceramic blade and/or vane molding and finishing machines; and
(q) Inertial blade and/or vane welding machines.

1081A Machinery for use in the manufacture of aircraft, as follows:	-------[1]	PQSTVWYZ	1,000	MG		1

(a) Machinery specially designed for the working or forming of aircraft sheet, plate, or extrusion;
(b) Machinery specially designed for the milling of aircraft skin; and
(c) Specially designed parts and accessories therefor.

1086A Machines and equipment specially designed for the manufacture of aircraft or aircraft-derived gas turbine engines, as follows:	-------[1]	PQSTVWYZ	1,000	MG		1

(a) Compressor or turbine disc turning machines;
(b) Rotor grinders;
(c) Compressor or turbine disc broaching machines;
(d) Compressor or turbine disc computerized inspection machines; and
(e) Specially designed parts and accessories therefor.

1088A Gear making and/or finishing machinery, as follows:	-------[1]	PQSTVWYZ	1,000	MG		1

(a) Bevel gear making machinery:
(1) Gear grinding machinery (non-generating type);
(2) Other machinery capable of the production of bevel gears of module finer than 0.5 mm (diametrical pitch finer than 48) and meeting a quality standard better than DIN 58405 Class 6 (if rated in AGMA or Admiralty standards and not rated in DIN 58405, AGMA 11 or Admiralty Class I shall be considered to be the equivalent of DIN 58405 (Class 6));
(b) Machinery capable of producing gears in excess of AGMA quality level 13 or equivalent (if not rated in AGMA standards, DIN 3963 Class 4 shall be considered equivalent to AGMA quality level 13); and
(c) Specially designed parts and accessories therefor.

1091A (a) Units for numerically controlling simultaneously coordinated (contouring and continuous path) movements of machine tools and dimensional inspection machines in two or more axes, *except units having all of the following characteristics:*	-------[1]	PQSTVWYZ	1,000	MG		1, 4[2]

(1) Hardwired (not softwired, i.e., not Computerized Numerical Control (CNC));
(2) No more than two contouring interpolating axes can be simultaneously coordinated (interpolating is understood to be any mathematical function including linear and circular; the units may have one or more positioning axes in addition to two contouring axes. The units may have more than one set of two contouring axes (*e.g.*, units controlling two independent railheads on a vertical turret lathe), provided a separate feedrate number is required for each set of two contouring axes, and a single feedrate number (standard or optional) does not control more than two contouring axes);

[1] Report machines in "number."
[2] The countries to which commodities in this entry are controlled for nuclear reasons are those *not* listed in Supp. No. 2 or Supp. No. 3 to Part 373.

Commodity Control List—399.1 Group O CCL-3

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control

Entry No. 1091 (cont.)

(3) Minimum programmable increment equal to or greater (coarser) than 0.001 mm (0.00004 in.); and

(4) Without interface to allow direct computer input;

(b) Machine tools and dimensional inspection machines, which according to the manufacturer's technical specifications can be equipped with controls described in sub-entry (a) above, *except:*

(1) Boring mills, milling machines, and machining centers, having all of the following characteristics:

(i) Maximum slide travel in any axis equal to or less than 3,000 mm (10 ft.);

(ii) Positioning accuracy of any axis equal to or greater than ±0.01 mm per 300 mm (0.0004 in./ft.) and 0.005 mm for each additional 300 mm (.0002 in./additional ft.);

(iii) Spindle horsepower equal to or less than 20 kW (25 hp);

(iv) Single-working spindle;

(v) Axial and radial axis motion measured at the spindle axis in one revolution of the spindle equal to or greater than $D \times 2 \times 10^{-4}$ mm TIR (peak-to-peak) where D is the spindle diameter in millimeters; and

(vi) Not more than 3 axes capable of simultaneously coordinated contouring motion regardless of the NC unit connected to the machine;

(2) Machine tools (other than the machines described in sub-entry (1) above) and dimensional inspection machines having all of the following characteristics:

(i) Positioning accuracy of any axis equal to or greater than ±0.01 mm per 300 mm (0.0004 in./ft.) and 0.005 mm for each additional 300 mm (0.0002 in./additional ft.);

(ii) Radial axis motion measured at the spindle axis equal to or greater than 0.0008 mm (0.00003 in.) TIR (peak-to-peak) in one revolution of the spindle (for lathes and other turning machines); and

(iii) Not more than 3 axes capable of simultaneously coordinated contouring motion regardless of the NC unit connected to the machine; (the machines in sub-entry (b)(*1*)(*iv*) above may have multiple tool heads or turrets, but only one working spindle (standard or optional) may be operative at a time; the machines defined in sub-entries (b)(*1*)(*vi*) and (b)(*2*)(*iii*) above may have more than one work station, but each station shall be limited to 2-axis contouring (e.g. vertical turret lathes with two independent railheads). The machines may have one or more discrete positioning mode axes *e.g.*, discrete positioning rotary table) in addition to the three contouring axes. Secondary contouring axes parallel to primary contouring axes (*e.g.*, W-axis of a boring mill that has a primary Z-axis) are not to be considered when determining the number of contouring axes; the value of the positioning accuracy described in sub-entries (b)(*1*)(*ii*) and (b)(*2*)(*i*) above does not include the width of backlash. This value is determined by the usual statistical methods (random tests), *i.e.*, by approaching from only one direction a minimum of five measurement points up to a maximum of twenty-five measurement positions as random tests along one axis. National standards, *e.g.*, the German VDI–DGQ–3441 and/or the United States NMTBA standard ("Definition and Evaluation of Accuracy and Repeatability for Numerically-controlled Machine-Tools," August 1972), can be taken as binding standards for this measuring method);

(c) Direct Numerical Control (DNC) systems consisting of a dedicated stored program computer acting as a host computer and controlling, on-line or off-line, one or more numerically-controlled machine tools or inspection machines, as defined in sub-entry (b) above, related software, and interface and communication equipment for data transfer between the host computer memory, the interpolation functions, and the numerically-controlled machine tools;

CCL-4 Group O Commodity Control List—399.1

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control

Entry No. 1091 (cont.)

(d) Specially designed sub-assemblies which, according to the manufacturer's technical specifications, can upgrade the capabilities of numerical control units and machine tools to meet the specifications described in sub-entry (a), (b), or (c) above; and

(e) Specially designed parts and accessories therefor. (See also entry No. 1093.)

5091D Now covered by entry No. 1532.

1093A Components and specially designed parts for machine tools and dimensional inspection machines described in entry No. 1091, as follows: | -------- | **PQSTVWYZ** | **500** | **MG** | **1, 3,[1] 4[2]**

(a) Spindle assemblies, consisting of spindles and bearings as a minimal assembly, *except those assemblies with axial and radial axis motion measured along the spindle axis in one revolution of the spindle equal to or greater (coarser) than the following:*

(1) 0.0008 mm (0.00003 in.) TIR (peak-to-peak) for lathes and turning machines; or

(2) $D \times 2 \times 10^{-6}$ mm TIR (peak-to-peak) where D is the spindle diameter in millimeters for milling machines, boring mills, jig grinders, and machinery centers;

(b) Lead screws, including ball nut screws, *except those having all of the following characteristics:*

(1) Accuracy equal to or greater (coarser) than 0.004 mm/300 mm (0.00016 in./ft.);

(2) Overall accuracy equal to or greater (coarser) than $(0.0025 + 5 \times 10^{-6} \times L)$ mm, where L is the effective length of the screw in millimeters and $(0.0001 + 5 \times 10^{-6} \times L)$ in. where L is the effective length of the screw in inches; and

(3) Concentricity of the center line of the journal bearing surface and the center line of the major diameter of the screw equal to or greater (coarser) than 0.005 mm (0.0002 in.) TIR (peak-to-peak) at a distance of 3 times the diameter of the screw or less from the journal bearing surface;

(c) Linear and rotary position feedback units including inductive type devices, graduated scales, and laser systems, *except:*

(1) Linear types having an accuracy equal to or greater (coarser) than $(0.0004 + 13 \times 10^{-6} \times L)$ mm, for L equal to or less than 100 mm and $(0.0015 + 2 \times 10^{-6} \times L)$ mm, for L greater than 100 mm, where L is the effective length of the linear measurement in millimeters and $(0.000016 + 13 \times 10^{-6} \times L)$ in. for L equal to or less than 4.0 in. and $(0.00006 + 2 \times 10^{-6} \times L)$ in., where L is the effective length of the linear measurement in inches; and

(2) Rotary types having an accuracy equal to or greater (coarser) than 2 seconds of arc;

(d) Linear induction motors used as drives for slides, having *all* of the following characteristics:

(1) Stroke greater than 200 mm;

(2) Nominal force rating greater than 45 N; and

(3) Minimum controlled incremental movement less than 0.001 mm; and

(e) Specially designed parts and accessories therefor.

[1] Foreign policy controls on commodities in this entry apply only to sub-entry (a).
[2] The countries to which commodities in the entry are controlled for nuclear reasons are those not listed in Supp. No. 2 or Supp. No. 3 to Part 378.

Commodity Control List—399.1 Group O—1 CCL-5

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control
4094B Mandrels and bellows forming dies, as follows:	--------	PQSTVWYZ and Canada	0	MG	4
(a) Mandrels or forming dies, two piece cylindrical having a single indented circumferential convolution bisected by the two halves and having the following dimensions:					
(1) 3 in. to 16 in. outside diameter;					
(2) ½ in. or more in length; and					
(3) Single convolution depth more than 2 mm; and					
(b) Mandrels or forming dies, hollow two piece cylindrical having a single internal intended circumferential convolution bisected by the two halves and having the following dimensions:					
(1) 3 in. to 16 in. inside diameter;					
(2) ½ in. or more in length; and					
(3) Single convolution depth more than 2 mm.					
6098F Other machinery and equipment (including tools, fixtures, and jigs) specially designed or modified for the manufacture of equipment utilized in the exploration for, or production of, petroleum or natural gas; and specially designed parts and accessories therefor, as follows:	--------	SZ, Afghanistan and the USSR [1, 2]	—	MG	3
Dowel hole drilling machines, Cone bit drilling machines, Cone bit milling machines, Bit-arm milling machines, Pipe perforating machines, Liner mills, Casing mills, Cone buster mills, Collar mills, Packer mills, and					
Machinery and equipment, n.e.s., specially designed or modified for the manufacture of equipment utilized in the exploration for, or production of, petroleum or natural gas.					
6099G [2,3] Other metal-working machinery, n.e.s.; and parts and accessories, n.e.s.	--------	SZ [2, 3]	—	MG	3
GROUP 1—CHEMICAL AND PETROLEUM EQUIPMENT [4]					
1110A Gas liquefying equipment, as follows:	-------- [5]	PQSTVWYZ	500	MG	—
(a) Equipment for the production of liquid hydrogen, *except plants with a capacity of less than 1½ tons per 24-hour day and not designed for, or capable of, the production of hydrogen slush;*					1
(b) Equipment for the production of liquid fluorine; and					1, 4 [6]
(c) Specially designed parts and acessories therefor.					4 [6]

[1] Including Estonia, Latvia, and Lithuania.
[2] A validated license also is required for export to the Republic of South Africa and Namibia if intended for delivery to or for use by or for military or police entities in these destinations or for use in servicing equipment owned, controlled, or used by or for these entities. See §§ 371.2(c)(ii) and 385.4(a).
[3] A validated license is also required for export or reexport to the U.S.S.R. if the exporter knows or has reason to know the commodity is for any use directly in preparation for, in conduct of, in support of, or visually identified with the 1980 Summer Olympic Games scheduled to commence in Moscow on July 19, 1980. These commodities are subject to controls under the authority of the foreign policy provisions contained in section 6 of the Export Administration Act of 1979. This commodity control list entry as well as the other entries in this Group are subject to controls on the basis of the above criteria.
[4] See § 370.10 for commodities which require export authorization from other U.S. Government Departments and Agencies.
[5] Report equipment in "number."
[6] The countries to which commodities in this entry are controlled for nuclear reasons are those *not* listed in Supp. No. 2 or Supp. No. 3 to Part 373.

CCL-6 Group 1 Commodity Control List—399.1

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control
1118A Equipment for the production of military explosives and solid propellants, as follows:	-------[1]	PQSTVWYZ	0[2]	MG	—
(a) Complete installations;					1, 3, 5
(b) Specialized components (for example, dehydration presses; extrusion presses for the extrusion of small arms, cannon and rocket propellants; cutting machines for the sizing of extruded propellants; sweetie barrels (tumblers) 6 feet and over in diameter and having over 500 pounds product capacity; and continuous mixers for solid propellants); or					1, 3, 5
(c) Nitrators, continuous types; and					1
(d) Specially designed parts and accessories therefor.					1
2120A Cryogenic equipment, the following:	---------	PQSTVWYZ	500	MG	—
(a) Equipment designed for maintaining an ambient temperature below −274° F (−170° C):					1
(1) Designed for use in marine, airborne, or space applications, or					
(2) Ruggedized for mobile ground use;					
(b) Electrical, magnetic, and electronic equipment or components, and electrical conductors, specially designed for operation continuously or discontinuously at ambient temperatures below −274° F (−170° C), as follows:					1
(1) Superconductive metals, alloys, compounds, composites, and intercalate materials, *except:*					1
(i) Superconductive wire having a filament cross-sectional area of 4.42×10^{-3} sq. mm. (or 75 microns diameter) or greater; or					
(ii) Superconductive niobium-titanium wire having a filament cross-sectional area of 1.26×10^{-3} sq. mm. (or 40 microns diameter) or greater in a copper matrix;					
(2) Components, the following:					1
(i) Josephson effect devices; (iv) Super-normal-super (SNS) proximity devices; (ii) Dayem bridges; (v) Memory and logic devices; and (iii) Proximity effect bridges; (vi) Phase slip devices;					
(3) Superconducting electromagnets (including superconducting solenoids) rated for producing peak magnetic inductions of 3 teslas (30 kilogauss) or greater at overall current densities of 10,000 amperes per square centimeter or greater and specialized components therefor, *except:*					1, 4[3]
(i) Those which can be fully charged/discharged in 1 minute or more, provided that they are not specially designed for gyrotron applications;					
(ii) Those which are specially designed to be fully charged/discharged in less than 1 minute and have all of the following characteristics:					
(a) Wound with wire, cable or tape consisting of niobium-titanium superconductive filaments in a copper matrix;					
(b) Inner diameter less than 6 cm;					
(c) Maximum energy delivered per pulse divided by the duration of that pulse not exceeding 500 kJ per minute; and					

[1] Report equipment in "number."
[2] The GLV $ value limit for the following countries is $500: Australia, Belgium, Denmark, France, the Federal Republic of Germany (including West Berlin), Greece, Iceland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Turkey and the United Kingdom.
[3] The countries to which commodities in this entry are controlled for nuclear reasons are those not listed in Supp. No. 2 or Supp. No. 3 to Part 373.

Commodity Control List—399.1 Group 1 CCL-7

Export Control Commodity Number Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control
Entry No. 2120 (cont.)					
(4) Superconducting electrical equipment (rotating machines and transformers), and specialized components therefor; *except:*					1
(i) Superconducting electrical equipment for civil electrical power transmission and distribution;					
(ii) Direct current hybrid homopolar generators that have a single-pole normal metal armature operating at ambient temperatures and rotating in a magnetic field produced by superconducting windings, provided these windings are the only superconducting component in the generator; and					
(c) Specially designed accessories, sub-assemblies, parts, or components for sub-entries (a) and (b) above.					1, 4
("Overall current density" is defined as the total number of ampere-turns in the coil (that is, the sum of the number of turns multiplied by the maximum current carried by each turn) divided by the total cross section of the coil (comprising the superconductive filaments, the metallic matrix in which the superconductive filament is embedded, the encapsulating material, any cooling channels, etc.).)					
Previous entry No. 4127 (Valves, 0.5 cm to 3 cm in diameter . . .) now covered by entry No. 3131.					
3127A Now covered by entry No. 3131.					
4127B Pipe valves having all of the following characteristics:	[1]	PQSTVWYZ	500	MG	4
(a) A pipe size connection of 8 inches or more inside diameter;					
(b) All flow contact surfaces *made of or lined with* alloys of 10 percent or more nickel and/or chromium;					
(c) Rated at 1,500 psi or more; and					
(d) Parts, n.e.s.					
4128B Pipes, valves, fittings, heat exchangers, or magnetic, electrostatic or other collectors made of graphite or stainless steel, or of other materials coated in graphite, yttrium or yttrium compounds resistant to the heat and corrosion of uranium vapor.		PQSTVWYZ	0	MG	4
1129A Vacuum pumps, as follows:	[1]	PQSTVWYZ	500	MG	1
(a) Turbo-molecular pumps having a higher capacity than 2,000 liters of nitrogen per second;					
(b) Diffusion pumps rated for unbaffled pumping speeds of more than 50,000 liters of nitrogen per second at pressures of 10^{-6} mm of mercury or less;					
(c) Cryopump systems (*i.e.*, systems in which the circulation of liquefied gas is used to achieve a vacuum, static or dynamic, by lowering the temperature of the environment) designed to operate at temperatures of less than −328°F (−200°C) measured at atmospheric pressure; and					
(d) Specially designed parts, controls, and accessories for the above pumps.					
1131A Pumps (*except vacuum pumps listed under entry No. 1129*) having *any* of the following characteristics:	[1]	PQSTVWYZ	500	MG	1
(a) Designed to move molten metals by electromagnetic forces; or					1, 4

[1] Report pumps, valves, cocks, and regulators in "number."

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control
Entry No. 1131 (cont.)					
(b) Having all flow contact surfaces made of 90 percent or more tantalum, titanium, or zirconium, either separately or combined, *except when such surfaces are made of materials containing more than 97 percent and less than 99.7 percent titanium;* and					1
(c) Specially designed parts and accessories therefor.					1, 4
3131A Valves, 0.5 cm or greater in diameter, with bellows seal, wholly made of or lined with aluminum, nickel, or alloy containing 60 percent or more nickel, either manually or automatically operated; and specially designed parts and accessories therefor.	----------	PQSTVWYZ and Canada	0	MG	1, 4
1133A Valves, cocks and prossure regulators having all flow contact surfaces made of 90 percent or more tantalum, titanium, or zirconium, either separately or combined, *except when such surfaces are made of materials containing more than 97 percent and less than 99.7 percent titanium;* and specially designed parts and accessories therefor.	----------[1]	PQSTVWYZ	500	MG	1
1142A Tubing, as follows:	Ft.	PQSTVWYZ	500	MG	1
(a) Tubing made of, lined with, or covered with any of the fluorocarbon materials covered by sub-entry 1754(a)(2), unreinforced, heat shrinkable and having an inner diameter (before shrinkage) of less than 1⅛ inches (28.57 mm); and					
(b) Reinforced tubing (including connectors and fittings for usage with such tubing) incorporating coagulated dispersion grades of polytetrafluoroethylene, copolymers of tetrafluoroethylene and hexafluoropropylene, or any of the fluorocarbon materials covered by sub-entry 1754(a)(2) and designed for operating (working) pressures of 3,000 psi (210.9 kg/cm^2) or greater, whether or not specially processed to make the flow surfaces electrically conductive.					
1145A Containers, jacketed only, specially designed for the storage and/or transportation of liquid fluorine, and specially designed parts and accessories therefor.	----------	PQSTVWYZ	1,000	MG	1
6191F Equipment utilized for the exploration or production of petroleum or natural gas; and specially designed parts and accessories therefor. (See § 399.2, Interpretation 30, for illustrative list of commodities included in this entry.)	----------	SZ, Afghanistan and the USSR[2, 3]	—	MG	3
6199G[3,4] Other chemical and petroleum equipment, n.e.s.; and parts and accessories, n.e.s.	----------	SZ[3, 4]	—	MG	3
GROUP 2—ELECTRICAL AND POWER-GENERATING EQUIPMENT[5]					
1203A Electric vacuum furnaces, as follows:	----------	PQSTVWYZ	500	MG	1
(a) Consumable electrode vacuum arc furnaces with a capacity in excess of 20 tons;					
(b) Skull type vacuum arc furnaces; and					
(c) Specialized parts and controls for the above furnaces.					

[1] Report pumps, valves, cocks, and regulators in "number."
[2] Including Estonia, Latvia, and Lithuania.
[3] A validated license also is required for export to the Republic of South Africa and Namibia if intended for delivery to or for use by or for military or police entities in these destinations or for use in servicing equipment owned, controlled, or used by or for these entities. See § 371.2(c)(11) and § 385.4(a).
[4] A validated license is also required for export or reexport to the U.S.S.R. if the exporter knows or has reason to know the commodity is for any use directly in preparatior for, in conduct of, in support of, or visually identified with the 1980 Summer Olympic Games scheduled to commence in Moscow on July 19, 1980. These commodities are subject to controls under the authority of the foreign policy provisions contained in section 6 of the Export Administration Act of 1979. This commodity control list entry as well as the other entries in this Group are subject to controls on the basis of the above criteria.
[5] See § 370.10 for commodities which require export authorization from other U.S. Government Departments and Agencies.

Commodity Control List—399.1 Group 2 CCL-9

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control
4203B Electric furnaces specially designed for the production or processing of vapor deposited (pyrolytic) graphite or doped graphites, whether as standing bodies, coatings, linings, or substrates; and parts, accessories, and attachments, n.e.s. (Specify by name and characteristics.)	---------	PQSTVWYZ	1,000 [1]	MG	1
1201A Now covered by entry No. 6299.					
1205A Electrochemical, semi-conductor, and radioactive devices for the direct conversion of chemical, solar, or nuclear energy to electrical energy, as follows:	---------	PQSTVWYZ	500	EE	—
(a) Electrochemical devices, as follows:					1
(1) Fuel cells operating at temperatures of 392°F (200°C) or less, including regenerative cells, *i.e.*, cells for generating electric power, to which all the consumable components are supplied from outside the cell (the temperature of 392°F (200°C) or less is intended to refer to the fuel cell and not to the fuel conditioning equipment, which may be either an ancillary or an integral part of the fuel cell battery and which may operate at over 392°F (200°C));					
(2) Primary cells and batteries having *any* of the following characteristics:					
(i) Possessing a means of activation and having an open circuit storage life in the unactivated condition, at a temperature of 70°F (21°C), of 10 years or more;					
(ii) Capable of operating at temperatures from below —13°F (—25°C) to above 131°F (55°C), including cells and cell assemblies (other than dry cells) possessing self-contained heaters; or					
(iii) Utilizing a lithium anode with lithium salt solute in organic solvent (non-aqueous) electrolyte and having an energy density at the 24-hour discharge rate of greater than 100 Watt-hours per pound at 75°F (24°C) and greater than 35 Watt-hours per pound at —20°F (—29°C) (energy density is obtained by multiplying the average power in watts (average voltage times average current in amperes) by the duration of the discharge in hours to 90 percent of the initial load voltage and dividing by the total weight of the cell (or battery) in pounds. As regards secondary (rechargeable) batteries, energy density is measured after 500 charge/discharge cycles.);					
(3) Mechanically rechargeable leak-proof batteries having cells with removable zinc plates with porous air electrodes and immersed in electrolyte of potassium hydroxide; or					
(4) Molten salt electrolyte cells and batteries which normally operate at temperatures of 302°F (150°C) or below;					
(b) Photo-voltaic cells, as follows:					1
(1) With a power output of 14 mW or more per sq. cm. under 100 mW per sq. cm. tungsten (2,800°K) illumination;					
(2) All gallium arsenide photo-voltaic cells excluding those having a power output of less than 4 mW measured by the above technique; or					
(3) With a power output of 450 mW or more per sq. cm. under 10 Watts per sq. cm. silicon carbide (1,750°K) illumination;					
(c) Power sources other than nuclear reactors based on radioactive materials systems (see also sub-entries 1570(c) and (d)), *except:*					1, 4 [2]
(1) *Those having an output power of less than 0.5 Watt and a total weight of more than 200 lbs. (90.7 kg); or*					
(2) *Those specially designed and developed for medical use within the human body;* and					
(d) Specialized parts, components, and sub-assemblies of the above devices. (Specify by name and type number.)					1, 4 [2]

[1] The GLV $ value limit for Country Group Q is $1,000.
[2] The countries to which commodities in this entry are controlled for nuclear reasons are those *not* listed in Supp. No. 2 or Supp. No. 3 to Part 373.

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control
1206A Electric arc devices for generating a flow of ionized gas in which the arc column is constricted, *except devices wherein the flow of gas is for isolation purposes only and devices of less than 100 kW for cutting, welding, melting, plating, and/or spraying;* equipment incorporating such devices; and specially designed parts, accessories, and control or test equipment for such devices.	- ----[1]	POSTVWYZ	500	MG	4[1]
3240A Now covered by entry No. 3261.					
4240B Now covered by entry No. 4261.					
3261A Neutron generator systems, including tubes, designed for operation without an external vacuum system, and utilizing electrostatic acceleration to induce a tritium-deuterium nuclear reaction; and specially designed parts therefor.	--[2]	POSTVWYZ	0	EE	1, 4
4261B Particle accelerators having *all* of the following specifications:	-----[3]	POSTVWYZ	500	EE	4
(a) Peak beam power exceeding 500 MW;					
(b) Output energy exceeding 500 kV; and					
(c) An output beam intensity exceeding 2,000 amperes with a pulse width of 0.2 microsecond or less; and					
(d) Specially designed parts and accessories therefor.					
6299G[4,5] Other electrical and power generating equipment, n.e.s.; and parts and accessories, n.e.s.	-------	SZ[4,5]	—	MG	3
GROUP 3—GENERAL INDUSTRIAL EQUIPMENT[6,7]					
1305A Metal rolling mills, as follows:	---------	POSTVWYZ	1,000	MG	1
(a) Mills specially designed or re-designed for the rolling of metals and alloys with a melting point exceeding 1,900°C; and					
(b) Specialized controls, parts, and accessories for the above mills.					
1312A Presses and specialized controls, accessories, and parts therefor, as follows:	-------[8]	POSTVWYZ	1,000	MG	—
(a) Presses specially designed or re-designed for the working or forming of metals, alloys, or other materials with a melting point exceeding 3,452°F (1,900°C);					1
(b) Hydraulic presses, as follows:					1
(1) Vertical presses having a total rated force of over 10,000 tons; or					
(2) Horizontal presses having a total rated force of over 5,000 tons;					
(c) Isostatic presses, as follows (isostatic presses are those capable of pressurizing a closed					1, 4

[1] The countries to which commodities in this entry are controlled for nuclear reasons are those not listed in Supp. No. 2 or Supp. No. 3 to Part 373.
[2] Report systems and tubes in "number."
[3] Report accelerators in "number."
[4] A validated license also is required for export to the Republic of South Africa and Namibia if intended for delivery to or for use by or for military or police entities in these destinations or for use in servicing equipment owned, controlled, or used by or for these entities. See § 371.2(c)(11) and § 385.4(a).
[5] A validated license is also required for export or reexport to the U.S.S.R. if the exporter knows or has reason to know the commodity is for any use directly in preparation for, in conduct of, in support of, or visually identified with the 1980 Summer Olympic Games scheduled to commence in Moscow on July 19, 1980. These commodities are subject to controls under the authority of the foreign policy provisions contained in section 6 of the Export Administration Act of 1979. This commodity control list entry as well as the other entries in this Group are subject to controls on the basis of the above criteria.
[6] See § 370.10 for commodities which require export authorization from other U.S. Government Departments and Agencies.
[7] For mechanical measuring instruments, see entry No. 1532.
[8] Report machines in "number."

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control
Entry No. 1312 (cont.)					
cavity through various media (gas, liquid, solid particles, etc.) to create equal force in all directions within the cavity upon a workpiece or material):					
(1) Capable of achieving a maximum working pressure of 20,000 psi (1,406 kg/cm²) or greater and possessing a chamber cavity with an inside diameter in excess of 16 inches (40.6 cm); or					
(2) Capable of achieving maximum working pressure of 5,000 psi (351 kg/cm²) or greater and having a controlled thermal environment within the closed cavity, *except those possessing a chamber cavity with an inside diameter of less than 5 inches (127 mm) and which are also capable of achieving and maintaining a controlled thermal environment only between +176°F (+80°C) and −31°F (−35°C);* and					
(d) Control equipment, accessories, and parts which are specially designed for the above presses.					1, 4
2317A Miscellaneous equipment and materials, as follows:	----------	PQSTVWYZ	1,000	MG	—
(a) Closed and semi-closed circuit (rebreathing) apparatus for diving and underwater swimming;					1
(b) Specially designed components for use in the conversion of open-circuit apparatus to military use;					1
(c) Power controlled searchlights and control units therefor, designed for military use, and equipment mounting such units;					1
(d) Construction equipment built to military specifications, specially designed for airborne transport; and					1, 3
(e) Specially designed parts and accessories therefor.					1, 3
2319A Environmental chambers capable of pressures below 10^{-4} Torr, and specialized parts, components, and ancillary equipment therefor.	----------	PQSTVWYZ	1,000	MG	1
3323A Now covered by entry No. 3336.					
3331A Now covered by entry No. 3363.					
Previous 3336A (Generators . . .) now covered by entries No. 3362 and 4363.					
3336A[1] Plants specially designed for the production of uranium hexafluoride (UF_6) and specially designed or prepared equipment (including UF_6 purification equipment), and specially designed parts and accessories therefor.	----------	PQSTVWYZ and Canada	0	MG	1, 4
4337B Compressors and blowers as follows especially designed or prepared to be corrosion resistant to hydrogen sulfide, and having all of the following characteristics:	----------	PQSTVWYZ	0	MG	4
(a) Capable of sustaining a pressure in hydrogen sulfide in excess of 15 atmospheres;					
(b) Having an intake-to-discharge pressure ratio between 0.3 and 3.0; and					
(c) Having a capacity equal to or equivalent to or requiring at least 500 hp.					

[1] For exports of technical data related to these commodities, see §§ 379.4(c)(5), (6), (7), and (8).

CCL-12 Group 3 Commodity Control List—399.1

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control
1352A Machinery specially designed for the extrusion of materials covered by entry No. 1754, sub-entry (a)(2); and specially designed parts, components and accessories therefor.	--------[1]	PQSTVWYZ	500	MG	1
1353A Equipment specially designed for the manufacture of communication cable described in entry No. 1526; and specially designed parts and accessories therefor.	--------	PQSTVWYZ	500	MG	1
1355A Machinery and equipment for the manufacture of electronic equipment, components, and materials; related test gear; parts and specialized controls and accessories thereof, as follows:	--------	PQSTVWYZ	500[2]	MG	1

(a) Equipment specially designed for the manufacture of embargoed vacuum and gas-filled tubes, and of parts and sub-assemblies thereof;

(b) Equipment for the manufacture of semi-conductor, acoustic wave and film memory devices, of electronic equipment and components covered by entry No. 1564 II(b) and (c), and of parts, materials and sub-assemblies thereof, as follows (See Notes 1 through 4 at the end of 1355):

(1) Equipment for the processing of semi-conductor materials for the manufacture of devices, equipment and components specified in the heading of this sub-entry as follows:

(i) Equipment specially designed for purifying or processing III-V and II-VI semi-conductor materials covered by entry No. 1757, except crystal pullers, for which see sub-paragraph (ii) below;

(ii) Crystal pullers, furnaces, and gas systems, as follows:

(a) Types with digitally controlled temperature, power input or gas flow;

(b) Diffusion, oxidation and annealing furnaces for operation at pressures above 1 atmosphere (nominal);

(c) Plasma-enhanced or photo-enhanced chemical reactor equipment;

(d) Equipment for automatic control of crystal taper and diameter, *except taper and diameter control mechanisms using any of the following equipment techniques:*

(1) *Radiation pyrometers;*

(2) *Thermocouples;*

(3) *RF power sensors;*

(4) *Mass weighing (without digital or anomally control permitting the growth of semiconductors);*

(e) Crystal pullers having any of the following characteristics:

(1) Rechargeable without replacing the crucible container;

(2) Capable of operation at pressures above 10^5 pascals (1 atmosphere absolute);

(3) Capable of pulling crystals of a diameter greater than 76.2 mm (3 inches);

(f) Vacuum induction-heated zone-refining equipment for operation at a pressure of 0.01 pascal or less;

(iii) Equipment for the epitaxial growth of semi-conductor materials having either of the following characteristics:

[1] Report photographic plates in "sq. ft.", and machinery and equipment in "number."
[2] The GLV $ value limit for sub-entry (b)(4) is $100.

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control

Entry No. 1355 (cont.)

(a) Operation at pressures below 10^5 pascals (1 atmosphere absolute);

(b) Digitally controlled;

(iv) Molecular beam epitaxial growth equipment;

(v) Magnetically enhanced sputtering equipment (*Note:* "Magnetically enhanced" refers to equipment incorporating a cathode assembly having an integral magnetic structure for enhancing the plasma intensity.);

(vi) Equipment designed for ion implantation, or for ion-enhanced or photo-enhanced diffusion;

(vii) Equipment for selective or non-selective removal by dry methods of passivation layers, dielectrics, semi-conductor materials, resists or metals; *except vacuum sputtering equipment designed to operate in the sputter-etch mode;*

(viii) Equipment for semi-conductor device fabrication operating below 10^5 pascals (1 atmosphere absolute) for the chemical vapor deposition of oxides, nitrides, metals and poly-silicon; *except reactive-sputtering equipment;*

(ix) Electron beam systems, *except electron beam deposition systems,* (including all scanning electron microscopes), capable of mask making or semi-conductor device processing and having any of the following characteristics:

(a) Electrostatic beam deflection;

(b) Shaped, non-Gaussian beam profile;

(c) Beam blanking capability *except those equipped for Auger analysis;*

(d) Digital-to-analog conversion rate greater than 3 MHz;

(e) Digital-to-analog conversion accuracy greater than 12 bits;

(f) Target-to-beam position feedback control precision of 1 micrometer or finer.

(2) Masks, mask substrates, mask-making equipment and image transfer equipment for the manufacture of devices, equipment and components specified in the heading of this sub-entry (b) as follows: (The term "masks" refers to those used in electron beam lithography, X-ray lithography, and for ultraviolet lithography, as well as the usual ultraviolet and visible photo-lithography.)

(i) Finished masks and mask artwork;

(ii) Hard surface (*e.g.*, chromium, silicon, iron oxide) coated substrates (*e.g.*, glass, quartz, sapphire) for the preparation of masks having dimensions greater than 76.2 x 76.2 mm (3 x 3 inches);

(iii) Computer-aided design (CAD) equipment, for transforming schematic or logic diagrams into artwork for producing semi-conductor devices or microcircuits, having any of the following functions:

(a) Storage of pattern cells for subdivision of integrated circuits;

(b) Scaling, positioning, or rotation of pattern cells;

(c) Interactive graphic capabilities;

(d) Design rule and circuit checking;

(e) Circuit layout modification of the arrangement of the elements;

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control

Entry No. 1355 (cont.)

(iv) Computer programs which perform any of the functions in sub-paragraph (iii) above; or which can be used for integrated circuit transient analysis, or for integrated circuit logic analysis or logic checking, or for automatic routing or cell placement for integrated circuits.

(v) Mask fabrication machines using photo-optical methods as follows:

(a) Step and repeat cameras capable of producing arrays larger than 63.5 x 63.5 mm (2.5 x 2.5 inches), or capable of producing a single exposure larger than 3.75 x 3.75 mm (0.15 x 0.15 inches) in the focal plane, or capable of producing useful line widths of 3.5 micrometers or less;

(b) Pattern generators specially designed for the generation and/or manufacture of masks or the creation of patterns in photosensitive layers and with placement precision finer than 10 micrometers;

(c) Mask fabrication equipment containing automatic adjustment of focus or adjustment of the mask material into the focal plane;

(d) Equipment for altering masks to remove defects;

(For electron-beam systems, see sub-entry 1355(b)(1)(ix).)

(vi) Mask inspection equipment as follows:

(a) For comparison with a precision of 0.75 micrometer or finer over an area of 63.5 x 63.5 mm (2.5 x 2.5 inches) or greater;

(b) Digitally controlled equipment with a resolution of 0.25 micrometer or finer and with a precision of 0.75 micrometer or finer over a distance in one or two coordinates of 63.5 mm (2.5 inches) or greater;

(c) Digitally controlled defect inspection equipment (conventional scanning electron microscopes, except when specially designed and instrumented for automatic pattern inspection, are not covered by sub-paragraph (vi)(c)).

(vii) Align and expose equipment using photo-optical methods, including projection image transfer equipment, capable of performing any of the following functions:

(a) Production of a useful pattern size of less than 5 micrometers;

(b) Alignment with a precision finer than 1 micrometer;

(c) Field coverage greater than 76.2 x 76.2 mm (3 x 3 inches);

(d) Wafer backside alignment;

(e) Automatic alignment by the sensing of patterns or index marks on the substrate;

(f) Projection image transfer for processing slices (wafers) of 50.8 mm (2 inches) or greater in diameter;

(Non-contacting (proximity) image transfer equipment is covered only by sub-entry 1355(b)(2)(vii)(a) to (vii)(e).)

(viii) Electron beam, ion beam, or X-ray equipment for projection image transfer;

(For laser equipment, see Note 3, below);

(ix). Photo–optical or non photo–optical step and repeat or partial field equipment for the transfer of the image onto the wafer;

(x) Mask contact image transfer equipment for imaging a field greater than 76.2 x 76.2 mm (3 x 3 inches).

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Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control

Entry No. 1355 (cont.)

(3) Digitally controlled inspection equipment for the detection of defects in processed wafers or chips using optical pattern comparison or other machine scanning techniques.

(Conventional scanning electron microscopes, except when specially designed and instrumented for automatic pattern inspection, are not covered by this sub-entry.);

(4) Equipment for the assembly of microcircuits as specified in the heading of sub-entry (b) as follows:

(i) Digitally controlled die (chip) mounters;

(ii) Digitally controlled wire bonders and welders for performing consecutive bonding operations;

(iii) Equipment for producing multiple bonds in a single operation (*e.g.*, beam lead bonders, chip carrier bonders, tape bonders);

(5) Digitally controlled wafer probing equipment having any of the following characteristics:

(i) Positioning accuracy finer than 50 micrometers, or incremental steps finer than 6.4 micrometers;

(ii) Individual die location read-out (X-Y position information) during testing;

(iii) Capability of testing devices having more than a total of 24 terminals;

(iv) Automatic slice (wafer) alignment;

(6) Test equipment as follows (for standard test instruments, see entry No. 1529):

(i) Computer-controlled equipment specially designed for testing discrete semi-conductor devices and unencapsulated dice, capable of performing any of the following functions:

(a) Measurement of time intervals of less than 10 nanoseconds;

(b) Measurement of parameters (*e.g.*, f_T, S-parameters, noise figure) at frequencies greater than 250 MHz;

(c) Resolution of currents of less than 100 picoamperes;

(d) Measurement of spectral response at wavelengths outside the range from 450 to 950 nanometers;

(Discrete semi-conductor devices include, for example, diodes, transistors, thyristors, photocells, and solar cells.)

(ii) Digitally controlled equipment specially designed for testing microcircuits, and assemblies thereof, capable of performing any of the following functions:

(a) Functional (truth table) testing at a pattern rate greater than 2 MHz;

(b) Resolution of currents of less than 1 nanoampere;

(c) Testing of integrated circuits (not mounted on circuit boards) in packages having more than a total of 24 terminals;

(This sub-entry does not cover equipment specially designed for and dedicated to the testing of circuits not covered by entry No. 1564.)

(d) Measurement of rise times, fall times and edge placement times with a resolution of less than 20 nanoseconds.

TECHNICAL NOTES:

1. The terms "microcircuit" and "assembly" are defined in entry No. 1564.

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control

Entry No. 1355 (cont.)

2. Test equipment which is not of a general-purpose nature and which is specially designed for, and dedicated to, testing assemblies or a class of assemblies for home and entertainment applications is not covered by sub-entry 1355(b)(6).

3. Equipment which is used in the manufacture and processing of semi-conductors and semi-conductor materials and which is specially designed to employ lasers and/or laser technology is covered by entry No. 1522.

4. The term "digitally controlled" refers to automated equipment whose functions are partially or entirely controlled by stored, digitally coded, electrical signals. This does not cover equipment with controls using the following:

(a) Cams and other purely mechanical means;

(b) Switches including thumbwheel switches;

(c) Plugboards;

(d) On-off and analog controllers;

(e) Diode matrices;

(f) Punched paper tape controls without internal memory.

4355B Machinery and equipment for the manufacture of electronic components and materials, as follows:	----------	PQSTVWYZ	500	MG		1

(a) Equipment for the deposition of uncompensated polycrystalline silicon in the form of rods (ingots, boules), pellets, sheets or small particles not on a single crystal silicon substrate from silane (SiH_4), silicon tetrachloride ($SiCl_4$), trichlorosilane ($SiHCl_3$), dichlorosilane (SiH_2Cl_2) or monochlorosilane (SiH_3Cl);

(b) Sawing and surface finishing equipment specially designed for the processing of semi-conductor wafers (slices).

1356A Machinery for the working of synthetic film used as a dielectric (condenser tissue) or as magnetic recording tape, as follows:	----------	PQSTVWYZ	500	MG		1

(a) Vacuum metallizing machinery specially designed for the continuous strip roll coating with metallized sheathing of synthetic film used as a dielectric in capacitors described in entry No. 1560, capable of being used with any of the following devices, whether or not equipped with such devices:

(1) Cutting devices for slitting the film into strips suitable for capacitors;

(2) Shadow masks or similar devices to achieve uncoated strips;

(3) Controls for the automatic correction of the coating process; or

(4) Special devices to burn out the metal deposit on pinholes to prevent electrical faults in the capacitors;

(b) Specialized components and parts for the above machinery; and

(c) Equipment, components, and parts specially designed for the continuous coating of polyester base magnetic tape intended for the equipment described in entry No. 1572.

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control
1357A Filament winding, tape-laying and interlacing machines using materials described in entry No. 1763, as follows:		PQSTVWYZ	500	MG	1, 4

(a) Machines of which the motions for positioning, wrapping, and winding of fibers are coordinated and programed in three or more axes, specially designed to fabricate composite structures or laminates from fibrous and filamentary materials, and the mechanical parts of the machines, coordinating, and programing controls; or

(b) Machines of which the motions for positioning and laying of tapes and sheets are coordinated and programed in two or more axes, specially designed for the manufacture of composite airframe and missile structures; or

(c) Machines, including specialized parts, components, adapters and modification kits, for weaving, interlacing or braiding fibers to fabricate composite structures, *except textile machinery which has not been modified for the above end-uses; and*

(d) Specialized parts, components, and accessories therefor.

1358A Machinery and equipment specially designed for the manufacture of devices and assemblies thereof described in entry No. 1588 sub-entries (b), (c), (d), and (e) and for magnetic recording media other than tape described in entry No. 1572 sub-entry (d) (for magnetic tape equipment, see (entry No. 1356), as follows:		PQSTVWYZ	500	MG	1

(a) Equipment for the manufacture of single and multi-aperture forms described in entry No. 1588 sub-entries (b), (c), and (d), as follows:

(1) Automatic presses to produce types described in (a) above;

(2) Press dies to produce types described in (a) above; and

(3) Automatic equipment for monitoring, grading, sorting, exercising and/or testing of types described in (a) above;

(b) Equipment for the manufacture of thin film memory storage or switching devices having square hysteresis loops and automatic equipment for monitoring, grading, sorting, exercising, and/or testing of devices described in entry No. 1588 sub-entry (e);

(c) Automatic equipment for monitoring, exercising, and/or testing assemblies of devices described in entry No. 1588 sub-entries (b), (c), (d), and (e);

(d) Equipment for the application of magnetic coatings to recording media described in entry No. 1572 sub-entry (d);

(e) Automatic and semi-automatic equipment for monitoring, grading, exercising, and/or testing recording media described in entry No. 1572 sub-entry (d); and

(f) Specialized test equipment, parts, and controls for the above.

(The term "automatic" refers to machinery not requiring the assistance of a human operator to complete its function or functions during each complete cycle of operations. The term "semi-automatic" refers to machinery requiring the assistance of a human operator to complete part but not all of its functions during each complete cycle of operations. The term "functions" does not include the initial loading or final unloading of material from the machine.)

CCL-18 Group 3 Commodity Control List—399.1

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control
1361A Wind tunnels, as follows:	--------	PQSTVWYZ	1,000	MG	1
(a) Supersonic (Mach 1.4 to Mach 5), hypersonic (Mach 5 to Mach 15) and hypervelocity (above Mach 15) wind tunnels, *except wind tunnels specially designed for educational purposes and having a test section size (measured internally) of less than 10 in. (25 cm).* (By "test section size" is understood the diameter of the circle, or the side of the square, or the longest side of the rectangle constituting possible shapes of the test section.);					
(b) Devices for simulating flow-environments at Mach 5 and above, regardless of the actual Mach number at which the devices operate, including hot shot tunnels, plasma arc tunnels, shock tubes, shock tunnels, gas tunnels and light gas guns;					
(c) Wind tunnels and devices, other than two dimensional (2-D) sections, that have unique capabilities for simulating Reynolds number flow in excess of 25×10^6, at transonic velocities; and					
(d) Specially designed parts and accessories for the above.					
1362A Vibration test equipment, as follows:	--------	PQSTVWYZ	500	MG	1, 4
(a) Vibration test equipment using digital control techniques and specially designed ancillary equipment and software therefor, *except:*					
(i) Individual exciters (thrusters) with a maximum thrust of less than 100 kN (22,500 lb);					
(ii) Analog equipment;					
(iii) Mechanical and pneumatic exciters (thrusters);					
(iv) Vibrometers;					
(v) Digital ancillary equipment not covered by entry Nos. 1529, 1531, 1565 or 1568;					
(b) High intensity acoustic test equipment capable of producing an overall sound pressure level of 140 dB or greater (referenced to $2 \times 10^{-5} \frac{N}{m^2}$) or with a rated output of 4 kW or greater and specially designed ancillary equipment and software therefor, *except:*					
(i) Analog equipment;					
(ii) Digital ancillary equipment not covered by entry Nos. 1529, 1531, 1565 or 1568;					
(c) Ground vibration (including modal survey) test equipment that uses digital control techniques and specially designed ancillary equipment and software therefor, *except:*					
(i) Analog equipment;					
(ii) Digital ancillary equipment not covered by entry Nos. 1529, 1531, 1565 or 1568.					
3362A Power generating and/or propulsion equipment specially designed for use with military nuclear reactors. (This entry does not modify Office of Munitions Control coverage, as indicated in Category VI, Part e of the U.S. Munitions List. See Supp. No. 2 to Part 370.)	-------[1]	PQSTVWYZ	100	MG	1, 4
3363A Electrolytic cells for the production of fluorine with a production capacity greater than 250 grams of fluorine per hour; and specially designed parts and accessories therefor.	--------	PQSTVWYZ	500	MG	1, 4

[1] Report generators and sets, turbines, exchangers, and exchange type condensers in "number."

Commodity Control List—399.1 Group 3 CCL-19

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits TSU	Processing Code	Reason for Control
4363B Nuclear reactor and nuclear power plant related equipment as follows:	--------	PQSTVWYZ	0	MG	4[1]
(a) Reactor and power plant simulators, models or mock-ups;					
(b) Process control systems intended for use with nuclear reactors;					
(c) Generators, turbine-generator sets, steam turbines, heat exchangers, and heat exchanger type condensers designed or intended for use in a nuclear reactor; and					
(d) Commodities, parts and accessories specially designed or prepared for use with nuclear plants (*e.g.*, snubbers, airlocks, reactor inspection equipment) *except* items licensed by the NRC pursuant to 10 CFR 110.					
1370A Turning machines for generating optical quality surfaces using a single point cutting tool, and components and accessories therefor, as follows:	No.	PQSTVWYZ	500	MG	1, 4
(a) Turning machines having all of the following characteristics:					
(1) Slide positioning accuracy less (finer) than 0.0005 mm per 300 mm of travel, TIR (peak-to-peak);					
(2) Slide positioning repeatability less (finer) than 0.00025 mm per 300 mm of travel, TIR (peak-to-peak);					
(3) Spindle runout (radial and axial) less than 0.0004 mm TIR (peak-to-peak);					
(4) Angular deviation of the slide movement (yaw, pitch and roll) less (finer) than 2 seconds of arc (peak-to-peak) over full travel;					
(5) Slide perpendicularity less than 0.001 mm per 300 mm of travel, TIR (peak-to-peak); (Turning machines will be evaluated under the conditions yielding the most accurate values, including but not limited to the incorporation of control systems which permit mechanical, electronic and software compensation.)					
(b) Components, as follows:					
(1) Spindle assemblies, consisting of spindles and bearings as a minimal assembly, *except those assemblies with axial and radial axis motion measured along the spindle axis in one revolution of the spindle equal to or greater (coarser) than 0.0008 mm TIR (peak-to-peak);*					
(2) Linear induction motors used as drives for slides, having all of the following characteristics:					
(i) Stroke greater than 200 mm;					
(ii) Nominal force rating greater than 45 N; and					
(iii) Minimum controlled incremental movement less than 0.001 mm; or					
(c) Accessories, *i.e.*, single point diamond cutting tool inserts having all of the following characteristics:					
(1) Flawless and chip-free cutting edge when magnified 400 times in any direction;					
(2) Cutting radius between 0.1 and 5 mm; and					
(3) Cutting radius out-of-roundness less than 0.002 mm TIR (peak-to-peak); and					
(d) Specially designed parts and components therefor.					
1371A Anti-friction bearings, as follows:	--------	PQSTVWYZ	500	MG	1
(a) Ball and roller bearings having an inner bore diameter of 10 mm or less and tolerances of ABEC 5, RBEC 5 (or national equivalents) or better and either of the following characteristics:					
(1) Made of special materials, *i.e.*, with rings, balls or rollers made from any steel alloy or other material including, but not limited to high-speed tool steels, Monel metal, beryllium, metaloids, ceramic, and					

[1] The countries to which commodities in this entry are controlled for nuclear reasons are those *not* listed in Supp. No. 2 or Supp. No. 3 to Part 373.

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control
Entry No. 1371 (cont.)					
sintered metal composites *except the following: low-carbon steel; SAE-52100 high-carbon chromium steel; SAE-4615 nickel molybdenum steel; AISI-440C (SAE-51440C) stainless steel; or national equivalents;* and/or					
(2) Manufactured for use at normal operating temperatures over 302°F (150°C) either by use of special materials or by special heat treatment;					
(b) Ball and roller bearings *except separable ball bearings and thrust ball bearings,* having an inner bore diameter exceeding 10 mm and having tolerances of ABEC 7, RBEC 7 (or national equivalents) or better (ABEC 5 in the case of hollow bearings) and either of the following characteristics:					
(1) Made of special materials, *i.e.,* with rings, balls, or rollers made from any steel alloy or other material including, but not limited to, high-speed tool steels, Monel metal, beryllium, metaloids, ceramics, and sintered metal composites *except the following: low-carbon steel; SAE-52100 high-carbon chromium steel; SAE-4615 nickel molybdenum steel; AISI-440C (SAE-51440C) stainless steel; or national equivalents;* and/or					
(2) Manufactured for use at normal operating temperatures over 302 F (150°C) either by use of special materials or by special heat treatment;					
(c) Ball and roller bearings having tolerances better than ABEC 7 (or national equivalents); and					
(d) Bearing parts usable only for bearings covered by this entry, as follows: outer rings, inner rings, retainers, balls, rollers, and sub-assemblies.					
6390F Other machinery and equipment (including tools, fixtures, and jigs) specially designed or modified for the manufacture of equipment utilized in the exploration for, or production of, petroleum or natural gas; and specially designed parts and accessories therefor, as follows:	----------	SZ, Afghanistan and the USSR [1]	—	MG	3
Pipe coating equipment;					
Pipe laying equipment;					
Pipe wrapping equipment; and					
Machinery and equipment, n.e.s., specially designed or modified for the manufacture of equipment utilized in the exploration for, or production of, petroleum or natural gas.					
5391D Now covered by entry No. 5399.					
6391F Other equipment utilized for the exploration or production of petroleum or natural gas; and specially designed parts and accessories therefor. (See § 399.2, Interpretation 30, for illustrative list of commodities included in this entry.)	----------	SZ, Afghanistan and the USSR [1]	—	MG	3
6398G Truck engine assembly lines, and subassemblies, components and parts thereof.	----------	SZ [2, 4, 5]	—	MG	3
5399D [2] Other general industrial equipment, n.e.s., *except those listed in § 399.2, Interpretation 29;* and parts and accessories, n.e.s.	----------	PQSWYZ [2] and Afghanistan	— [3]	MG	1
6399G [2,4] General industrial equipment listed in § 399.2, Interpretation 29; and parts and accessories, n.e.s.	----------	SZ [2, 4]	—	MG	3

[1] Including Estonia, Latvia, and Lithuania.

[2] A validated license also is required for export to the Republic of South Africa and Namibia if intended for delivery to or for use by or for military or police entities in these destinations or for use in servicing equipment owned, controlled, or used by or for these entities. See § 371.2(c)(11) and § 385.4(a).

[3] The GLV $ value limit for Country Group Q is $1,000.

[4] A validated license is also required for export or reexport to the U.S.S.R. if the exporter knows or has reason to know the commodity is for any use directly in preparation for, in conduct of, in support of, or visually identified with the 1980 Summer Olympic Games scheduled to commence in Moscow on July 19, 1980. These commodities are subject to controls under the authority of the foreign policy provisions contained in section 6 of the Export Administration Act of 1979. This commodity control list entry as well as the other entries in this Group are subject to controls on the basis of the above criteria.

[5] Under the foreign policy authority contained in section 6 of the Export Administration Act of 1979, a validated license is also required for export to the U.S.S.R. of such commodities for the Kama River Truck Complex. See § 385.2(f).

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control
GROUP 4—TRANSPORTATION EQUIPMENT [1]					
2404A Rockets and missiles, guided or unguided, as follows:	--------	PQSTVWYZ	500	MG	1
(a) Meteorological sounding rockets;					
(b) Non-irritant smoke flares, canisters, grenades, and charges;					
(c) Other pyrotechnic articles having dual military and commercial use;					
(d) Rocket launching ramps, towers, and associated equipment for meteorological rockets; and					
(e) Specially designed parts for the above.					
2406A Vehicles specially designed for military purposes, as follows:	--------	PQSTVWYZ	0	MG	1, 3, 5
(a) Specially designed military vehicles, excluding vehicles listed in Supplement No. 2 to Part 370;					
(b) Pneumatic tire casings *(excluding tractor and farm implement types)*, of a kind specially constructed to be bullet proof or to run when deflated;					
(c) Engines for the propulsion of the vehicles enumerated above, specially designed or essentially modified for military use; and					
(d) Specially designed components and parts therefor.					
(See § 399.2, Interpretation 19, for aid in determining whether your commodity is covered by this entry.)					
5406D [2] Diesel engines, nonmagnetic, 50 brake horsepower and over, having a nonmagnetic content exceeding 50 percent, up to but not exceeding 75 percent of total weight; and parts and accessories, n.e.s. (Specify brake hp at rated rpm.)	--------	PQSWYZ [2] and Afghanistan	—[3]	MG	1
2409A Naval equipment as follows:	--------	PQSTVWYZ	1,000	MG	1
(a) Diesel engines of 1,500 hp and over with rotary speed of 700 rpm or over specially designed for submarines;					
(b) Electric motors specially designed for submarines, *i.e.*, over 1,000 hp, quick reversing type, liquid cooled, and totally enclosed;					
(c) Nonmagnetic diesel engines, 50 hp and over, specially designed for military purposes (An engine shall be presumed to be specially designed for military purposes if it has nonmagnetic parts other than crankcase, block, head, pistons, covers, end plates, valve facings, gaskets, and fuel, lubrication and other supply lines, or its nonmagnetic content exceeds 75 percent of total weight.);					
(d) Other magnetic, pressure, and acoustic underwater detection devices specially designed for military purposes; and controls and components thereof;					
(e) Marine boilers designed to have *any* of the following characteristics: (1) Heat release rate (at maximum rating) equal to or in excess of 190,000 BTU's per hour per cubic foot of furnace volume; or (2) Ratio of steam generated in pounds per hour (at maximum rating) to the dry weight of the boiler in pounds equal to or in excess of 0.83; and					
(f) Components, parts, accessories, and attachments for the above.					

[1] See § 370.10 for commodities which require export authorization from other U.S. Government Departments and Agencies.
[2] A validated license also is required for export to the Republic of South Africa and Namibia if intended for delivery to or for use by or for military or police entities in these destinations or for use in servicing equipment owned, controlled, or used by or for these entities. See § 371.2(c)(11) and § 385.4(a).
[3] The GLV $ value limit for Country Group Q is $100.

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limit T&V	Processing Code	Reason for Control
4409B Water tube boilers, marine type, designed to have a heat release rate (at maximum rating) equal to 180,000 BTU, up to but not including 190,000 BTU per hour per cubic foot of furnace volume; boiler superheaters, feedwater heaters, and economizers therefor; and parts and accessories therefor.	--------	PQSTVWYZ	1,000	MG	1
2410A Pressure refuellers, pressure refuelling equipment, and equipment specially designed to facilitate operations in confined areas and ground equipment, not elsewhere specified, developed specially for aircraft and helicopters, and specially designed parts and accessories, n.e.s.	--------	PQSTVWYZ	500	MG	1, 3
1416A Vessels, as follows:	--------	PQSTVWYZ	1,000	MG	1
(a) Hydrofoil vessels with automatically controlled foil systems which are capable of speeds of above 40 knots in rough water (Sea State Five);					
(b) Vessels incorporating any item included in a CCL entry beginning with the numeral 2 or listed in Supplement No. 2 to Part 370, any item described in entry Nos. 1485, 1501, 1502, and 1510 (*except all types of fish-finding or whale-finding equipment*), or incorporating degaussing facilities; and					
(c) Specially designed parts and accessories for the above. (Also see §§ 370.10(a) and (f).)					
1418A Deep submergence vehicles, manned or unmanned, tethered or untethered, capable of operating at depths exceeding 1,000 meters, and specially designed equipment, components and materials therefor, including but not limited to pressure housings or pressure hulls specially designed for normal operating pressures of more than 101 bars. (For syntactic foam, see entry No. 1759.)	--------	PQSTVWYZ	500	MG	1
1431A Gas turbine engines for marine propulsion of 3,500 rated shaft hp and above, whether originally designed as such or adapted for such use from aero-engines; and specially designed parts, n.e.s.	--------	PQSTVWYZ	1,000	MG	1
4431B Other marine propulsion steam turbines specially designed for naval use; and parts and accessories, n.e.s. (Specify hp or kW.)	--------	PQSTVWYZ	1,000	MG	1
5431D[1] Compressors, fans, and blowers, any type, specially designed or modified for military or naval shipboard use; and parts and attachments, n.e.s. (Specify by name.)	--------	PQSWYZ[1] and Afghanistan	—[2]	MG	1
1460A Nonmilitary aircraft and helicopters, aeroengines, and aircraft and helicopter equipment, as follows:	--------[3]	PQSTVWYZ	1,000	MG	—
(a) Helicopters over 10,000 lbs. (4,530 kg) empty weight, and power transmission systems therefor (empty weight is understood to include normal installation and normal minimum crew, but does not include fuel or payload);					1, 3[4]
(b) Other nonmilitary aircraft and helicopters, *except those which do not contain equipment listed in Supplement No. 2 to Part 370 or entry No. 1485 or 1501 and which are of types which are in a bona fide normal civil use;* (specify make and model of aircraft and type of avionic equipment on aircraft) and					1, 3[5]

[1] A validated license also is required for export to the Republic of South Africa and Namibia if intended for delivery to or for use by or for military or police entities in these destinations or for use in servicing equipment owned, controlled, or used by or for these entities. See § 371.2(c)(11) and § 385.4(a).
[2] The GLV $ value limit for Country Group Q is $500.
[3] Report aircraft, helicopters, and engines in "number."
[4] Foreign policy controls apply to helicopters over 10,000 lbs. empty weight for Libya, Syria, Iraq, the People's Democratic Republic of Yemen, the Republic of South Africa, and Namibia.
[5] Foreign policy controls apply to the Republic of South Africa and Namibia, for both aircraft and helicopters regardless of value, and to Libya, Syria, Iraq, and the People's Democratic Republic of Yemen for fixed-wing aircraft valued at $3,000,000 or more. Foreign policy controls do not apply to parts or engines.

Commodity Control List—399.1 Group 4 CCL-23

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits TAV	Processing Code	Reason for Control
Entry No. 1460 (cont.)					
(c) Aero-engines and specially designed parts and accessories, n.e.s., *except:*					1
(1) Piston engines;					
(2) Jet engines of less than 5,000 lbs. (2,265 kg) thrust; or					
(3) Turbo-prop or turbo-shaft engines of less than 2,500 hp or with a residual thrust of less than 1,000 lbs. (453 kg).					
(Specify make, model and pound thrust or horsepower.) (Also see § 399.2, Interpretation 20.)					
4460B Nonmilitary aircraft and helicopters, aero-engines, and aircraft and helicopter equipment, as follows:	--------	PQSTVWYZ	1,000	MG	1
(a) Other jet, turbo-prop, turbo-shaft, and gas turbine aircraft engines, as follows:					
(1) Under development for nonmilitary use, experimental or non-certified; or					
(2) Certified engines which have been in civil use for 3 years or less; and					
(3) Parts and accessories, n.e.s., therefor;					
(Specify make, model and pound thrust or horsepower); and					
(b) Parts and accessories, n.e.s., specially designed for nonmilitary:					
(1) Helicopters over 10,000 pounds weight; or					
(2) Helicopters 10,000 pounds or less empty weight or fixed-wing aircraft, of types which have been in normal civil use and containing one or more of the items listed in entry No. 1485 or 1501, or Supplement No. 2 to Part 370.					
(Specify make and model of aircraft, and type of avionic equipment on aircraft.) (Also see § 399.2, Interpretation 20.)					
5460F[1] Other nonmilitary aircraft and demilitarized military aircraft valued at $3,000,000 each or more.	--------	SZ[1] and Syria, Iraq, Libya, People's Dem. Rep. of Yemen, Rep. of South Africa & Namibia	—	MG	3
6460F[1] Other aircraft and helicopters, as follows:	--------	SZ[1] and the Rep. of South Africa & Namibia	—	MG	3
(a) Military aircraft, demilitarized (not specifically equipped or modified for military operations), *the following only:*					
(1) Cargo, "C-45 through C-118" inclusive, and "C-121",					
(2) Trainers, bearing a "T" designation and using piston engines,					
(3) Utility, bearing a "U" designation and using piston engines,					
(4) Liaison, bearing an "L" designation, and					
(5) Observation, bearing an "O" designation and using piston engines; and					
(b) Other nonmilitary helicopters and aircraft.					

[1] A validated license is also required for export or reexport to the U.S.S.R. if the exporter knows or has reason to know the commodity is for any use directly in preparation for, in conduct of, in support of, or visually identified with the 1980 Summer Olympic Games scheduled to commence in Moscow on July 19, 1980. These commodities are subject to controls under the authority of the foreign policy provisions contained in section 6 of the Export Administration Act of 1979. This commodity control list entry as well as the other entries in this Group are subject to controls on the basis of the above criteria.

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control
Entry No. 6460 (cont.)					
(Specify make and model of aircraft and type of avionic equipment on aircraft. See § 399.2, Interpretation 20. Also see Supplement No. 2 to Part 370 or entry No. 1485 or 1501 for aircraft which are not covered under this entry.)					
5480B [1] Nonmilitary mobile crime science laboratories; and parts and accessories, n.e.s. (See § 376.14.)	----------	PQSTVWYZ [1]	0	MG	3
1485A Compasses, gyroscopes, accelerometers, and inertial equipment, as follows:	----------	PQSTVWYZ	1,000	MG	1
(a) Gyro compasses with provision for determining and transmitting ship's level reference data (roll, pitch) in addition to own ship's course data;					
(b) Integrated flight instrument systems for aircraft which include gyrostabilizers and/or automatic pilots (An integrated flight instrument system is a primary instrument display system of attitude and azimuth with facilities for giving maneuver guidance information to the pilot and often integrated with an autopilot to the extent of embodying a common unit for setting up the required demands.);					
(c) Gyro-astro compasses and other devices which derive position and/or orientation by means of automatically tracking celestial bodies;					
(d) Gyrostabilizers used for other purposes than aircraft control, *except those for stabilizing an entire surface vessel;*					
(e) Automatic pilots used for other purposes than aircraft control *except marine types for surface vessels;*					
(f) Accelerometers with a threshold of 0.005 g or less, or a linearity error within 0.25 percent of full scale output or both, which are designed for use in inertial navigation systems or in guidance systems of all types;					
(g) Gyros with a rated free directional drift rate (rated free precession) of less than 0.5 degree (1 Sigma or r.m.s.) per hour in a 1 g environment;					
(h) Inertial or other equipment using accelerometers described in sub-entry (f) above and/or gyros described in sub-entry (g) above, and systems incorporating such equipment; and					
(i) Specially designed parts and components, and test, calibration, and alignment equipment for the above.					
5485D Now covered by entry No. 6499.					
6490F [2,3] Off-highway wheel tractors of carriage capacity 10 tons or more; and parts and accessories, n.e.s.	----------	SZ [2, 3] and Libya	—	MG	1
6499G [3] Other transportation equipment, n.e.s.; and parts and accessories, n.e.s.	----------	SZ [3] and Afghanistan	—	MG	3
9499M Vehicles mounted with telecommunications equipment (including radar). (See Group 5—Electronics and Precision Instruments.) (Specify mounted equipment.) (Report telecommunications equipment, including radar, exported as replacements or accessories under appropriate Export Control Commodity Number.)	No.	Export controls applicable to vehicles included in this entry are those which apply to the equipment mounted on the vehicle.		EE	—[4]

[1] A validated license *is not* required for export of these commodities to Australia, Belgium, Denmark, France, the Federal Republic of Germany (including West Berlin), Greece, Iceland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Turkey, and the United Kingdom.

[2] A validated license also is required for export to the Republic of South Africa and Namibia if intended for delivery to or for use by or for military or police entities in these destinations or for use in servicing equipment owned, controlled, or used by or for these entities. See § 371.2(c)(11) and § 385.4(a).

[3] A validated license is also required for export or reexport to the U.S.S.R. if the exporter knows or has reason to know the commodity is for any use directly in preparation for, in conduct of, in support of, or visually identified with the 1980 Summer Olympic Games scheduled to commence in Moscow on July 19, 1980. These commodities are subject to controls under the authority of the foreign policy provisions contained in section 6 of the Export Administration Act of 1979. This commodity control list entry as well as the other entries in this Group are subject to controls on the basis of the above criteria.

[4] The reasons for control applicable to vehicles included in this entry are those which apply to the equipment mounted on the vehicle.

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control

GROUP 5—ELECTRONICS AND PRECISION INSTRUMENTS [1]

15014	Navigation, direction finding, radar and airborne communication equipment, as follows:	--------	PQSTVWYZ	1,000	EE	1

(See also entry No. 1485 sub-entries (b) and (h), and entry No. 2120 sub-entries (b) and (c).)

(a) Airborne communication equipment and specialized parts and components therefor, having *any* of the following characteristics:

(1) Designed to operate at frequencies greater than 156 MHz;

(2) Incorporating facilities for:

(i) The rapid selection of more than 200 channels per equipment; or

(ii) Equipment using frequency synthesis techniques (see also entry No. 1531), *except equipment operating in the frequency range of 108 to 136 MHz with 720 channels or fewer at not less than 25 kHz spacing, and which has been in normal civil use for at least one year;*

(3) Pressurized throughout;

(4) Rated for continuous operation over a range of ambient temperatures extending from below −55°C to +55°C; or

(5) Designed for modulating methods employing any form of digital modulation using time and frequency redundancy such as "Quantized Frequency Modulation" (QFM);

(b) Navigation and direction finding equipment (and specialized parts and accessories, specialized testing or calibrating equipment and training or simulating equipment therefor), as follows:

(1) Airborne navigation and direction finding equipment, as follows:

(i) Designed to make use of "Doppler" frequency phenomena;

(ii) Utilizing the constant velocity and/or rectilinear propagation characteristics of electromagnetic waves having frequency less than 4×10^{14} Hz (0.75 micron);

(iii) Radio altimeters, the following:

(*a*) Pulse modulated;

(*b*) Frequency modulated having a displayed electrical output accuracy better than ±3 feet (±0.914 m) over the range between 0 and 100 feet (30.4 m) or better than ±3 percent above 100 feet (30.4 m); or

(*c*) Frequency modulated which have been in normal civil use for less than one year;

(iv) Direction finding equipment operating at frequencies greater than 5 MHz, *except equipment designed for search and rescue purposes, provided that the receiver operates on a crystal controlled fixed frequency of 121.5 MHz or on alternating frequencies of 121.5 MHz and 243 MHz;*

(v) Pressurized throughout; or

(vi) Rated for continuous operation over a range of ambient temperatures extending from below −55°C to above +55°C;

[1] See § 370.10 for commodities which require export authorization from other U.S. Government Departments and Agencies.

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control

Entry No. 1501 (cont.)

(2) Ground and marine equipment for use with airborne navigation equipment utilizing the constant velocity and/or the rectilinear propagation characteristics of electromagnetic waves having frequency less than 4×10^{14} Hz (0.75 micron); or

(3) Ground and marine direction finding equipment operating at frequencies greater than 30 MHz; and

(c) Radar equipment and specialized parts and accessories, specialized testing or calibrating equipment and training or simulating equipment therefor, as follows (for lidar equipment, see entry No. 1522):

(1) Airborne radar equipment; or

(2) Ground and marine radar equipment having one or more of the following features:

(i) Operating at a frequency not in normal civil use or at a frequency of more than 10.5 GHz;

(ii) Operating at a frequency of less than 1.5 GHz and having a peak output power from the transmitter greater than 2.5 MW; or operating at a frequency within the range of 1.5 to 3.5 GHz and having a peak output power from the transmitter greater than 1.5 MW; or operating at a frequency within the range of 3.5 to 6 GHz and having a peak output power from the transmitter greater than 1 MW; or operating at a frequency within the range of 6 to 10.5 GHz and having a peak output power from the transmitter greater than 500 kW;

(iii) Operating at a frequency of less than 3.5 GHz and having an 80 percent or better probability of detection for a 10 sq. meter target at a free space range of 250 nautical miles; or operating at a frequency within the range of 3.5 to 10.5 GHz and having an 80 percent or better probability of detection for a 10 sq. meter target at a free space range of 100 nautical miles;

(Cumulative probability of detection is determined on the principle on which it is based, according to the following parameters:)

(a) Radial closing velocity of the target: 2,000 feet per second (610 meters per second);

(b) Probability of false alarm: 10^{-8};

(c) Operator factor: 3 dB; and

(d) Fluctuation of the target in accordance with Rayleigh distribution.)

(iv) Utilizing other than pulse modulation with a constant and/or staggered pulse repetition frequency, in which the carrier frequency of the transmitted signal is not changed deliberately between groups of pulses, from pulse to pulse or within a single pulse, *except civil commercial airport radars using a carrier frequency that may change from pulse to pulse between two fixed frequencies separated in time and in frequency by constant magnitudes;*

(v) Utilizing a Doppler technique for any purpose, other than M.T.I. systems using a conventional double or triple pulse delay line cancellation technique, *except those utilized for surveillance and control radars for aerial navigation in civil airports;*

(vi) Including any digital signal processing techniques used for automatic target tracking, or having a facility for electronic tracking;

(vii) Including signal processing techniques other than those covered by sub-entry (c)(2)(vi) above, which have been in normal civil use for a period of less than two years; or

(viii) In the case of ground radar, having been in commercial use for a period of less than one year.

(Specify by name and model number.)

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control
1502A Communication, detection or tracking equipment of a kind using ultra-violet radiation, infrared radiation or ultrasonic waves; *except ultrasonic devices which operate in contact with a controlled material to be inspected, or which are used for industrial cleaning, sorting or materials handling, industrial and civilian intrusion alarm, traffic and industrial movement control and counting systems, medical applications, emulsification, homogenization, or simple educational or entertainment devices; underwater ultrasonic communications equipment designed for operation with amplitude modulation and having a communications range of 500 m or less (sea state 1), a carrier frequency of 40 to 60 kHz and a carrier power supplied to the transducer of 1 W or less; industrial equipment employing cells not described in entry No. 1548; industrial and civilian intrusion alarm, traffic and industrial movement control and counting systems; medical equipment; industrial equipment used for inspection, sorting or analysis of the properties of materials; simple educational or entertainment devices which employ photo cells; flame detectors for industrial furnaces; equipment for non-contact temperature measurement for laboratory or industrial purposes utilizing a single detector cell with no scanning of the detector; or instruments capable of measuring radiated power or energy having a response time constant exceeding 10 milliseconds;* and specialized parts therefor. (Specify by name and model number.) (For communications equipment employing fiber optics, see entry No. 1519.)	-------[1]	PQSTVWYZ	0[2]	EE	1, 4, 5
1505A Television cameras incorporating electron tubes defined in entry No. 1555.	No.	PQSTVWYZ	0[2]	EE	1, 5
1510A Acoustic and/or ultrasonic systems or equipment specially designed for detecting or locating underwater or subterranean objects or features, and specially designed components of such systems or equipment (including but not limited to hydrophones and transducers, towed hydrophone arrays, software therefor, and beamformers), *except:* *(i) Marine systems or equipment, as follows:* *(A) Active (transmitting, or transmitting and receiving) systems or equipment, including but not limited to depth sounders and fish-finders and their associated beamformers, as follows:* *(1) Depth sounders used solely for measuring the depth of water or the distance of submerged and/or buried objects or fish and/or whales vertically below the apparatus;* *(2) Horizontally-operated fish, whale or object detection and/or location systems, having all of the following characteristics:* *(a) Transmitting frequency of 15 kHz or greater;* *(b) Sound pressure level less than 250 dB (reference 1 micropascal at 1 meter) for equipment with operating frequency between 15 and 40 kHz, with no decibel limitation for equipment operating at frequencies of 30 kHz or higher;* *(c) Transmission capability limited to ±10 percent of the design center frequency;* *(d) Not designed to withstand pressure during normal operation at depths greater than 1,000 meters;* *(e) Displaying a range of 5,000 meters or less;* *(3) Electronic noise sources for vertically directional use only, or mechanical (e.g., air gun or vapor-shock gun) or chemical (e.g., explosive) noise sources;* *(B) Passive (receiving, whether or not related in normal application to separate active equipment) acoustic hydrophones and/or transducers having all of the following characteristics:*	---------	PQSTVWYZ	500	MC	1, 5

[1] Report equipment in "number."
[2] The GLV $ value limit for the following countries is $500: Australia, Belgium, Denmark, France, the Federal Republic of Germany (including West Berlin), Greece, Iceland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Turkey and the United Kingdom.

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control

Entry No. 1510 (cont.)

(1) Incorporating sensitive elements made of piezoelectric ceramics or crystal, and with a sensitivity no greater than −192 dB (reference 1 volt per micropascal);

(2) Not designed for operation at depths greater than 100 meters;

(3) Independently mounted or configured and not reasonably capable of assembly by the user into a towed hydrophone array;

(ii) Terrestrial systems or equipment not reasonably capable of conversion by the user to underwater or marine applications as embargoed above.

(Passive hydrophone sensitivities in this entry are based on sensitivity being defined as 20 times the logarithm to the base 10 of the ratio of rms output voltage to a 1 volt reference, when the hydrophone sensor is placed in a plane wave acoustic field having an rms pressure of 1 micropascal. For example, a hydrophone of −160 dB (reference 1 volt per micropascal) would yield an output voltage of 10^{-} volts in such a field, while one of −180 dB sensitivity would yield only 10^{-} volts ouptut.)

5510D[1] Doppler sonal navigation equipment; and parts and accessories therefor.	----------	PQSWYZ[2] and Afghanistan	—[2]	MG	1
1514A Pulse modulators capable of providing electric impulses of peak power exceeding 6 MW or of a duration of less than 0.1 microsecond, or with a duty cycle in excess of 0.002; and pulse transformer, pulse-forming equipment or delay lines being specialized parts of such modulators; and specially designed parts and accessories therefor. (Specify by name and type number.)	---------[3]	PQSTVWYZ	1,000	EE	1
1516A Receivers, and specialized parts and accessories therefor, as follows:	---------[4]	PQSTVWYZ	0[5]	EE	1, 5

(a) Panoramic radio receivers (which search or scan automatically a part of the electromagnetic spectrum and indicate or identify the received signals); *except ancillary equipment for commercial receivers with which the frequency spectrum searched does not exceed either ±20 percent of the intermediate frequency of the receiver or ±2 MHz;*

(b) Digitally-controlled radio receivers, whether or not computer controlled, which search or scan automatically a part of the electromagnetic spectrum, in which the switching operation takes less than 10 milliseconds, and which indicate or identify the received signals, *except non-ruggedized digitally-controlled pre-set type radio receivers designed for use in civil communications which have 200 selective channels or fewer.* (For digitally-controlled radio receivers using frequency synthesizers see also enry No. 1531.); or

(c) Receivers for spread spectrum and frequency agile systems having a total transmitted bandwidth which is:

(1) 100 or more times greater than the bandwidth of any one information channel; and

(2) In excess of 50 kHz.

("Spread spectrum" is defined as the technique whereby energy in a relatively narrow-band communications channel is spread over a much wider energy spectrum under the control of a random or pseudo-random bit stream. On receipt, the signal is correlated with the same bit stream to achieve the reverse process of

[1] A validated license also is required for export to the Republic of South Africa and Namibia if intended for delivery to or for use by or for military or police entities in these destinations or for use in servicing equipment owned, controlled, or used by or for these entities. See § 371.2(c)(11) and § 385.4(a).
[2] The GLV $ value limit for Country Group Q is $500.
[3] Report modulators in "number."
[4] Report receivers in "number."
[5] The GLV $ value limit for the following countries is $500: Australia, Belgium, Denmark, France, the Federal Republic of Germany (including West Berlin), Greece, Iceland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Turkey and the United Kingdom.

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control
Entry No. 1516 (cont.)					
reducing the bandwidth to its original form. By allocating different bit streams to different subscribers transmitting simultaneously, significantly greater use can be made of available bandwidth.) ("Frequency agility" (or frequency hopping) is another form of spread spectrum in which the transmission frequency of a single communications channel is made to change by discrete steps under the control of a similar bit stream.) (See also entry No. 1517(c).)					
4516B Communications countermeasures equipment (electronic, mechanical, optical, or other) capable of detecting, monitoring, locating, or jamming surreptitious intercepting devices, *including but not limited to* special purpose broadband monitoring receivers with detection capabilities; optical and video detectors; microphone detectors; non-linear junction detectors; telephone analyzers; and special purpose spectrum analyzers; and parts and accessories, n.e.s. (Specify by name.)	----------[1]	PQSTVWYZ and Canada	0	EE	1
1517A Radio transmitters (for those incorporating transmitter drive units, exciters, and master oscillators using frequency synthesis, see entry No. 1531) and components, (for radio relay communications equipment, see entry No. 1520), as follows:	----------[2]	PQSTVWYZ	1,000	EE	1
(a) Transmitters or transmitter-amplifiers designed to operate at output frequencies greater than 960 MHz;					
(b) Transmitters or transmitter-amplifiers designed to provide any of the following features:					
(1) Any system of pulse modulation, *except amplitude, frequency or phase modulated television or telegraphic transmitters;* or					
(2) Rated for operation over a range of ambient temperatures extending from below −40°C to above +60°C;					
(c) Transmitters for spread spectrum and frequency agile systems having a total transmitted bandwidth which is:					
(1) 100 or more times greater than the bandwidth of any one information channel; and					
(2) In excess of 50 kHz; and					
(d) Components, accessories, and sub-assemblies specially designed for the above equipment (for quartz crystals, see entry No. 1587); *except the following transmitters or transmitter amplifiers, or systems containing such equipment, accessories and sub-assemblies therefor:*					
(1) Specially designed for medical applications and operating at I.S.M. frequencies;					
(2) Having an output power of not more than 10 Watts, which are especially designed for:					
(i) Industrial or civil intrusion detection and alarm,					
(ii) Industrial and traffic detection, counting, speed measurement, identification, and movement control, or					
(iii) Carrying the information from the equipment above, or the information of environmental, air or water, pollution detection and/or measurement systems;					
(3) Transmitters using wideband amplifiers designed for non-frequency agile civil appications, such as television and mobile service.					
(Specify by name and model number.)					
4517B Communications intercepting devices; and parts and accessories therefor. (Specify by name.) (Also see § 376.13.)	----------[3]	PQSTVWYZ and Canada	0	EE	—[3]

[1] Report modulators in "number."
[2] Report equipment and transmitters in "number."
[3] Controls on this equipment are maintained in accordance with the Omnibus Crime Control and Safe Streets Act of 1968 (P.L. 90-351).

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limit TSV	Processing Code	Reason for Control
1518A Telemetering and telecontrol equipment suitable for use with aircraft (piloted or pilotless) or space vehicles, and test equipment specially designed for such equipment, *except equipment specially designed to be used for remote control of toys such as model planes and boats and having electric field strength of not more than 200 microvolts per meter at a distance of 500 meters;* and specially designed parts and accessories therefor. (Specify by name and model number.)	-------[1]	PQSTVWYZ	1,000	EE	1
1519A Single- and multi-channel communications transmission equipment, including terminal, intermediate amplifier or repeater equipment and multiplex equipment used for communications (line, cable, optical fiber cable, or radio) systems, and data modems making use of the aforementioned communications systems, and associated multiplex equipment, *except telemetering, telecommand and telesignalling equipment designed for industrial purposes, together with data transmission equipment not intended for the transmission of written or printed text and specialized parts, accessories and test equipment therefor (by telemetering, telecommand and telesignalling equipment is meant: sensing heads for the conversion of information into electrical information, the systems used for its long-distance transmission, the processes used to translate electrical information into coded data (telemetering), into control signals (telecommand), and into display signals (telesignalling)); facsimile equipment other than that employing cipher, cryptographic and/or coding devices and equipment that are designed to ensure the secrecy of communications and thus prevent clear reception by anyone other than the intended receiver (see Supplement No. 2 to Part 370); equipment employing exclusively the direct current transmission technique, and electronic measuring equipment, suitable for use with PCM transmission equipment defined in CCITT recommendation series G 700 (ITU Geneva),* as follows: (a) Employing analog transmission techniques with analog input and output, designed to deliver, carry or receive baseband frequencies higher than 19 MHz into, or in, a communications system, but only higher than 300 kHz for equipment suitable for use with submarine cable (analog transmission techniques include, inter alia, frequency division multiplex (FDM)); (b) Employing digital transmission techniques designed for operation at a data signalling rate exceeding 2.1 Megabits per second, with analog input and output, designed for use on communications circuits (digital transmission techniques include, inter alia, pulse code modulation (PCM));[2] (c) Data communications equipment employing digital transmission with digital input and output, including telegraphic and data transmission, having any of the following characteristics: (1) Designed for operation at a data signalling rate in bits per second, excluding servicing and administrative channels, numerically exceeding either: (i) 4,800; or (ii) 160 percent of the channel (or sub-channel) bandwidth in Hertz; (2) Employing an automatic error detection and correction system having both of the following characteristics: (i) Retransmission is not required for correction; and (ii) A data signalling rate exceeding 300 bits per second; and (d) Components, accessories, and sub-assemblies specially designed for the above equipment, and test equipment specially designed for the equipment covered by sub-entry (b) above, except connections for use with optical fibers or cable with a repeatable coupling loss of 0.5 dB or more.[2]					

[1] Report equipment and transmitters in "number."

[2] See § 379.4(f)(1)(i)(q) for written assurance requirement for exports of technical data related to equipment described in sub-entry (b) or (d) of entry No. 1519 but having a data signaling rate of 2.1 megabits per second or less.

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Export Control Commodity Number / Commodity Description	Unit	Validated License Required	GLV $ Value Limits TLV	Processing Code	Reason for Control
Entry No. 1519 (cont.)					
("Data signalling rate" is as defined in ITU Recommendation 53–36, taking into account that for non-binary modulation, "bauds" and "bits per second" are not equal. Bits for coding, checking and synchronization functions are to be included; and data communications equipment designed to operate in one voice channel, "bandwidth" will normally be as defined in CCITT Recommendation G.151, namely 3,100 Hz. In the case of CCITT or CCIR voice frequency telegraph systems, "bandwidth" may be considered as the number of channels times the channel spacing.)					
(Specify by name and model number.)					
4519B Fiber optics systems and components as follows:	‖--------‖	PQSTVWYZ	500	EE	1
(a) Transmission and reception equipment, including terminals, amplifiers, repeaters, modems and multiplex equipment;					
(b) Graded index or single mode step index optical fiber communications cable and optical fibers therefor, having any of the following characteristics:					
(1) An attenuation at any operation wavelength of 5 dB/km or less;					
(2) A bandwidth of greater than 20 MHz/km or a pulse dispersion of less than 25 nsec/km;					
(3) A tensile strength greater than 7×10^9 N/m²;					
(c) Connectors and couplers for use with fibers or cables with a repeatable coupling loss of 0.5 dB or less.					
(For integrated optical devices see entry No. 1564; for laser transmitters see entry No. 1522.)					
1520A Radio relay communications equipment designed for use at frequencies exceeding 960 MHz, and components, accessories and sub-assemblies therefor.	‖--------[1]‖	PQSTVWYZ	1,000	EE	1
1521A Amplifiers and related equipment, as follows:	‖--------[1]‖	PQSTVWYZ	500	EE	1
(a) Tuned amplifiers having a bandwidth which exceeds 50 MHz or 10 percent of the mean frequency, whichever is less, *except those specially designed for use with civil television receivers (aerial amplifiers), for use in community television distribution systems or for use in radio communications equipment for frequencies not exceeding 32 MHz;*					
(b) Untuned amplifiers having a bandwidth which exceeds 10 MHz, *except*					
(i) Those having a bandwidth up to 50 MHz provided the power output does not exceed 20 watts;					
(ii) Those having a bandwidth between 50 MHz and 100 MHz provided the power output does not exceed 1 watt;					
(iii) Those operating in the range of 380 to 512 MHz and designed for civil comunications equipment provided the power output does not exceed 20 watts; and					
(iv) Those specially designed for use with civil television receivers (aerial amplifiers), for use in community television distribution systems or for use in radio communications equipment for frequencies not exceeding 32 MHz.					

[1] Report equipment in "number."

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control

Entry No. 1521 (cont.)

(The bandwidth is defined as the band of frequencies over which the power amplification does not drop to less than one-half of its maximum value. The mean frequency is defined as the arithmetic mean between the frequencies at which the power amplification is one-half of its maximum value. For amplifiers designed to operate at frequencies above 1 GHz, see entry No. 1537. For parametric amplifiers, etc., see entry No. 1537; for amplifiers specially designed for and intended to work with oscilloscopes, see entry No. 1584; and

(c) Specially designed parts and accessories therefor.

(Specify by name and model number.)

1522A Lasers and laser systems including equipment containing them as follows:	'-------'	PQSTVWYZ	500	EE	1, 4

(a) Lasers and specially designed components and parts therefor, including amplification stages, *except the following when not contained in equipment:*

(i) Argon, krypton and non-tunable dye lasers with both of the following characteristics:

(1) An output wavelength shorter than 0.8 micrometer; and

(2) A pulsed output not exceeding 0.5 Joule per pulse and an average or continuous wave maximum rated single- or multi-mode output power not exceeding 20 watts;

(ii) Helium-cadmium, nitrogen and multigas lasers not otherwise specified in this item with both of the following characteristics:

(1) An output wavelength shorter than 0.8 micrometer; and

(2) A pulsed output not exceeding 0.5 Joule per pulse and an average or continuous wave maximum rated single- or multi-mode output power not exceeding 120 watts;

(iii) Helium-neon lasers with an output wavelength shorter than 0.8 micrometer;

(iv) Ruby-lasers with both of the following characteristics:

(1) An output wavelength shorter than 0.8 micrometer; and

(2) An energy output not exceeding 20 Joules per pulse;

(v) CO_2, CO or CO/CO_2 lasers having either or both of the following characteristics:

(1) An output wavelength in the range of 9 to 11 micrometers, and a pulsed output not exceeding 2.0 Joules per pulse and a maximum rated average single- or multi-mode output power not exceeding 1,200 watts or a continuous wave maximum rated single- or multi-mode output power not exceeding 2,500 watts;

(2) An output wavelength in the range of 5 to 7 micrometers and having a continuous wave maximum rated single- or multi-mode output power not exceeding 50 watts;

(vi) Nd:YAG lasers having an output wavelength of 1.06 micrometers with either of the following characteristics:

(1) A pulsed output not exceeding 0.5 Joule per pulse and a maximum rated average single- or multi-mode output power not exceeding 10 watts or a continuous wave maximum rated single- or multi-mode output power not exceeding 50 watts; or

[1] Report lasers and systems in "number."

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control

Entry No. 1522 (cont.)

(2) A pulsed output not exceeding 10 Joules per pulse with a pulse width not less than 50 microseconds and a maximum rated average single- or multi-mode output power not exceeding 50 watts;

(vii) Nd:Glass lasers with both of the following characteristics:

(1) An output wavelength of 1.06 micrometers; and

(2) A pulsed output not exceeding 0.5 Joule per pulse;

(viii) Tunable CW dye lasers, with both of the following characteristics:

(1) An output wavelength shorter than 0.8 micrometer; and

(2) An output not exceeding an average or continuous wave maximum rated single- or multi-mode output power of 1 watt;

(ix) Tunable pulsed laser (for argon and krypton lasers, see sub-entry (a)(i) above), including dye and N_2, with all of the following characteristics:

(1) An output wavelength shorter than 0.8 micrometer;

(2) A pulse duration not exceeding 100 nanoseconds; and

(3) A peak power output not exceeding 1 MW;

(x) Single-element semi-conductor lasers with a wavelength shorter than 1 micrometer designed for, and used in, equipment as defined under sub-entries (b)(xiii) and (xiv) below;

(b) Equipment containing lasers and laser systems, *except equipment listed below containing lasers listed in (a) above as exceptions:*

(i) Specially designed for industrial and civilian intrusion detection and alarm systems;

(ii) Specially designed for medical applications;

(iii) Equipment for educational and laboratory purposes;

(iv) Specially designed for traffic and industrial movement control and counting systems;

(v) Specially designed for detection of environmental pollution;

(vi) Optical spectrometers and densitometers;

(vii) Equipment containing continuous wave helium-neon gas lasers (but see sub-entries (c) and (d) below);

(viii) Textile-cutting and textile-bonding equipment;

(ix) Paper cutting equipment;

(x) Equipment containing lasers for drilling diamond dies for the wire drawing industry;

(xi) Electronic daylight scanning equipment with auxiliary electronic screening unit specially designed for printing processes;

(xii) Laser-radar (lidar) equipment specially designed for surveying and meteorological observation;

(xiii) Consumer disc-type video and audio recorders and reproducers;

(xiv) Price scanners (point of sales);

(xv) Systems designed for surveying purposes, provided there is no capability of measuring range;

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control
Entry No. 1522 (cont.)					
(c) Laser measuring systems that maintain over the full scale a resolution equal to or less (finer) than 0.0001 mm and an accuracy equal to or less (finer) than 1.0 ppm for a 48-hour period over a temperature range of ±10°C around a standard temperature and at a standard pressure (Standard temperature and pressure as indicated in IEC Publication No. 160.);					
(d) Laser feedback systems and laser interferometers used in equipment covered by entry 1093.					
4522B Other lasers and laser systems, as follows:	----------[1]	PQSTVWYZ	100[2]	MG	1, 4
(a) Laser interferometers specially designed as feedback components for numerically controlled machine tools;					
(b) Gaseous lasers and specially designed components, parts, and amplifier stages therefor, which maintain an accuracy (stability) equal to or less than 1.0 part per million (1×10^{-6}) for at least a 24-hour period.					
(c) Specially designed parts and accessories therefore.					
1526A Cable, as follows:	Ft.	PQSTVWYZ	500	EE	1
I. Non-communications coaxial cable with the outer conductor electro-plated directly on spirally-grooved cable dielectric;					
II. Communications cable, as follows:					
(a) Submarine cable, as follows:					
(1) Reversed-twist, double-armored cable used for towing or suspending and communicating with submerged devices;					
(2) Unarmored or single-armored ocean cable having an attenuation of 1.8 dB per nautical mile (0.97 dB/km) or less, measured at a frequency of 600 kHz;					
(b) Coaxial cable using a dielectric aired by discs, beads, spiral, screw, or any other means, with an inner diameter of the outer conductor of the cores greater than 14 mm (0.551 in.);					
(c) Graded index or single-mode step index optical fiber communications cable and optical fibers therefor, having either of the following characteristics:					
(1) An attenuation at any operating wavelength of 5 dB/km or less; or					
(2) A tensile strength greater than 7×10^8 N/m²;					
(d) Secure communications cable, being either coaxial or multi-conductor communications cable protected by mechanical and/or electrical means from physical damage and/or intrusion in such a manner that communications security is maintained between terminals without the necessity for encryption, *except cable that is armored by only a tough outer sheath or that is electromagnetically screened only.*					
1527A[3] Cryptographic equipment and ancillary equipment (such as teleprinters, perforators, vocoders, visual display units) designed to ensure secrecy of communications (such as telegraphy, telephony, facsimile, video, data) or of stored information, their specialized components; and software controlling or performing the function of such cryptographic equipment. Also video systems which, for secrecy purposes, use digital techniques (conversion of an analog, *i.e.*, video or facsimile, signal into a digital signal) (This item also	----------[1]	PQSTVWYZ[3]	0	EE	1

[1] Report lasers and systems in "number."
[2] The GLV $ value limit for Country Group Q is $100.
[3] Exporters requesting a validated license from the Department of Commerce must provide a statement from the Department of State, Office of Munitions Control, verifying that the equipment intended for export is under the licensing jurisdiction of the Department of Commerce.

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control

Entry No. 1527 (cont.)

covers digital computers and differential analyzers (incremental computers) designed or modified for, or combined with, any cipher machines, cryptographic equipment, devices or techniques including software, microprogram control (firmware) and/or specialized logic control (hardware), associated equipment therefor, and equipment or systems incorporating such computers or analyzers), *except simple cryptographic devices or equipment only ensuring the privacy of communications, as follows:*

(a) Equipment for voice transmission making use of fixed frequency inversions and/or fixed band scrambling techniques in which the transposition changes occur not more frequently than once every 10 seconds;

(b) Standard civil facsimile and video equipment designed to ensure the privacy of communications by an analog transmission using nonstandard practices for intended receivers only (video system equipment effecting the transposition of analog data);

(c) Video systems for pay television and similar restricted audience television, including industrial and commercial television equipment using other than standard commercial sweep systems.

1528A **Now covered by entry No. 1526.**

1529A **Electronic measuring, calibrating counting,** testing, and or time interval measuring equipment, whether or not incorporating frequency standards, having any of the following characteristics: || No. || PQSTVWYZ || 1,000 || EE || —

(a) Equipment, as follows: 1

(1) Designed as reference frequency standards for laboratory use, with a stability over 24 hours or more of 1 part in 10^{11} or better;

(2) Designed for fixed ground use and containing frequency standard(s), with a stability over 24 hours of 1 part in 10^{9} or better; or

(3) Designed for portable or mobile use and containing frequency standard(s), with a stability over 24 hours of 1 part in 10^{8} or better;

(b) Instruments, as follows: 1

(1) Designed for use at frequencies exceeding 18 GHz;

(2) Designed and rated for use at frequencies exceeding 12.5 GHz, as follows:

(i) Comb frequency generators;

(ii) Transfer oscillators; or

(iii) Frequency converters;

(3) Designed for use at frequencies exceeding 1 GHz, as follows:

(i) Network analyzers (for automatic measurement of equivalent circuit parameters over a range of frequencies);

(ii) Specially calibrated microwave instrumentation receivers capable of measuring amplitude and phase simultaneously;

(iii) Instruments for the direct measurement of impedance; or

(iv) Instruments in which the functions can be controlled by the injection of digitally coded electrical signals from an external source;

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control

Entry No. 1529 (cont.)

(4) Spectrum analyzers employing time compression of the input signal of FFT (Fast Fourier Transform) techniques;

(5) Incorporating computing facilities with user accessible reprogramming capability and an alterable memory of more than 8,192 bits;

(6) Digital instruments incorporating computing facilities, as follows:

(i) Digital test instruments with user acccessible reprogramming capability [including digital circuit testers, logic (state and/or timing) analyzers, bus analyzers, serial data analyzers, digital word generators] specially designed for examining and/or comparing the absolute or relative information content (*e.g.*, logic states, mnemonics, etc.), or the timing of one or more digital bit streams, *except:*

(a) Logic probes, logic pulsers, digital current tracers (or current "sniffers"), signature analyzers and other digital circuit testers capable of observing single events and/or providing stimulus at single test points;

(b) Logic clips and logic comparators;

(c) Logic (state and/or timing) analyzers with not more than eight (not including qualifier channel) data channels and a maximum clock rate capability of 2 MHz or less;

(d) Digital word generators capable of operating at a maximum clock rate of 2 MHz or less with word lengths of 8 bits or less;

(ii) Microprocessor and microcomputer development instruments and systems, specially designed for use in debugging, diagnosing, emulating, simulating, designing, evaluating, programming or reprogramming firmware/software of signal processor-, computer- or memory-based devices, system or microsystems (*e.g.*, emulators, simulators, memory programmers, etc.) *except those which are used only with microprocessors and microcomputers not covered by entry No. 1564;*

(c) Digital counters, as follows: 1

(1) Capable of counting successive input signals with less than 5 nanoseconds time difference without prescaling (digital division) of the input signal (for counter/timers having a time interval measurement mode, see also sub-entry (d) below);

(2) Employing prescaling of the input signal, in which the prescaler is capable of resolving successive input signals with less than 1 nanosecond time difference; or

(3) Capable of measuring burst frequencies exceeding 100 MHz for a burst duration of less than 5 milliseconds;

(d) Time interval measuring equipment employing digital techniques, capable of measuring time intervals of less than 5 nanoseconds on a single shot basis; 1

(e) Testing equipment rated to maintain specified operating data when operating over a range of ambient temperatures from below −25°C to above +55°C; 1

(f) Digital voltage measuring apparatus, with or without electrical outputs, irrespective of the physical units in which calibrated, with a reading speed (from zero to the measured value but not including changes in range or polarity) faster than 25 accesses per second and having *any* of the following characteristics: 1

(1) A digital resolution at all points on the scale greater than one part in 200,000;

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	G.L.V. & Value Limits T&V	Processing Code	Reason for Control
Entry No. 1529 (cont.)					
(2) An accuracy better than 1 part in 50,000 (0.002 percent) of reading over an ambient temperature range of ± 5°C or more; or a stability better than 10 ⁻⁶ of reading over a period of 24 hours or more;					
(3) Capable of more than 500 independent measurements per second; *except visual quantization apparatus capable of providing an average value, displayed or not, of the results of the measurement; and Multichannel analyzers of all types used in nuclear experimentation;*					
(g) Transient recorders, utilizing analog-to-digital conversion techniques, capable of storing transients by sequentially sampling single input signals at successive intervals of less than 50 nanoseconds; and					1, 4
(h) Specially designed parts and accessories therefor.					1, 4
("User accessible reprogramming capability" as used in this entry means:					
(a) The instrument contains a computing facility, *e.g.*, a microprocessor; and					
(b) The user has the ability to alter the computing program through external controls, *e.g.*, switches, keyboards, digital buses, etc.)					
(Specify by name and model number.)					
4529B Other instruments, n.e.s., for measuring, indicating, recording, testing, or controlling electronic, electric, or nonelectric quantities that incorporate digital computers defined in entry No. 1565 sub-entries (d) and (e); and parts and accessories, n.e.s. (Specify by name and model number.)		PQSTVWYZ	1,000	MG	1
4530B UF₆ Mass Spectrometers, as follows:		PQSTVWYZ and Canada	1,000	MG	4
I. Mass spectrometers, magnetic or quadrupole:					
(a) Instruments having all of the following:					
(1) Unit resolution for greater than mass 320; and					
(2) Electron-bombardment ionization source; and					
(b) Having any of the following:					
(1) Molecular beam ion sources;					
(2) Ion source chambers constructed of or lined with nichrome or monel, or nickel plated;					
(3) A collector system suitable for simultaneous collection of two or more isotopic species; or					
II. Sources for mass spectrometers:					
(a) Molecular beam source; or					
(b) Ion source chambers constructed of or lined with nichrome or monel, or nickel plated; or					
(c) Sources for mass spectrometers designed especially for use with UF₆.					

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control
1531A Frequency synthesizers (and equipment containing such frequency synthesizers), as follows (frequency synthesizer means any kind of frequency source or signal generator, regardless of the actual technique used, providing a multiplicity of simultaneous or alternative output frequencies, from one or more outputs, controlled by, derived from or disciplined by a lesser number of standard (or master) frequencies):	[1]	PQSTVWYZ	1,000	EE	1

(a) Containing frequency standards described in sub-entry 1529(a) or temperature compensated crystal oscillators covered by sub-entry 1587(c);

(b) Instrument frequency synthesizers and synthesized signal generators designed for ground laboratory use, producing output frequencies whose accuracy and short and long term stability are controlled by, derived from or disciplined by the input frequency or internal master standard frequency, and having any of the following characteristics:

(1) A maximum output frequency in excess of 550 MHz;

(2) Having a phase noise to signal ratio better than −60 dB or an AM noise to signal ratio better than −70 dB referred to the 30 kHz band centered on the carrier, excluding the 1 Hz band centered on the carrier;

(3) Electrically programmable (in that the output frequency can be controlled or selected by the injection of digitally coded electrical signals from an external control source) with a switching speed from one selected output frequency to another selected output frequency less than 10 milliseconds;

(4) Having a level of spurious components in the output better than −80 dB non-harmonic and/or −60 dB harmonic component measured relative to the selected output frequency;

(5) Having more than 3 different selected synthesized output frequencies available simultaneously from one or more outputs;

(6) With facilities for pulse modulation of the output frequency; and

(7) Parts, components, accessories, and sub-assemblies, specially designed for the above equipment;

(c) Airborne communications equipment using frequency synthesizers, as follows (see also entry No. 1501 sub-entry (a)):

(1) Designed to receive or transmit frequencies greater than 156 MHz;

(2) Incorporating facilities for the rapid selection of more than 200 channels per equipment, *except those equipments operating in the frequency range of 108 to 136 MHz incorporating facilities for the rapid selection of 720 channels or fewer at not less than 25 kHz channel spacing which have been in normal civil use for at least one year;*

(3) With a switching speed from one selected output frequency to another of less than 10 milliseconds;

(4) Frequency synthesizers, designed for the above equipment, whether supplied separately or with the said equipment, exceeding the parameters specified in sub-entry (b) above; and

(5) Parts, components, accessories, and sub-assemblies, specially designed for the above equipment;

(d) Digitally-controlled radio receivers, whether or not computer controlled, which search or scan automatically a part of the electromagnetic spectrum, using frequency synthesizers, as follows (see also entry No. 1516):

(1) Digitally-controlled receivers in which the switching operation takes less than 10 milliseconds, *except, non-ruggedized digitally-controlled preset type radio receivers designed for use in civil communications, which have 200 selective channels or fewer;*

[1] Report synthesizers and equipment in "number."

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Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Codes	Reason for Control

Entry No. 1531 (cont.)

(2) Frequency synthesizers designed for the above equipment, whether supplied separately or with the said equipment, exceeding the parameters specified in sub-entry (b) above; and

(3) Parts, components, accessories, and sub-assemblies, specially designed for the above equipment; and

(e) Radio transmitters incorporating transmitter drive units, exciters and master oscillators using frequency synthesis, as follows (see also entry No. 1517):

(1) Having an output frequency of up to 32 MHz with a frequency resolution of better than 10 Hz and with a switching speed from one selected output frequency to another selected output frequency less than 10 milliseconds;

(2) Having an output frequency from 32 MHz to 235 MHz with a frequency resolution of better than 250 Hz and with a switching speed from one selected output frequency to another of less than 10 milliseconds;

(3) Having an output frequency greater than 235 MHz, *except*,

(i) Television broadcasting transmitters having an output frequency from 470 MHz to 960 MHz with a frequency resolution of not better than 1 kHz and where the manually-operated frequency synthesizer incorporated in or driving the transmitter has an output frequency not greater than 120 MHz; and

(ii) FM and AM ground communications equipment for use in the land mobile service and operating in the 420 to 470 MHz band, with a power output of 50 watts for mobile units and 300 watts for fixed units, with a frequency resolution of not better than 6.25 kHz and with a switching speed from one selected output frequency to another selected output frequency greater than 50 milliseconds;

(4) Having more than three different selected synthesized output frequencies available simultaneously from one or more outputs;

(5) With facilities for pulse modulation of the output frequency of the transmitter or of the incorporated frequency synthesizer;

(6) Frequency synthesizers designed for the above equipment, whether supplied separately or with the said equipment, exceeding the parameters specified in sub-entry (b) above; and

(7) Parts, components, accessories, and sub-assemblies, specially designed for the above equipment.

(Specify by name and model number.)

1532A Precision linear and angular measuring systems and components, as follows:	No.	PQSTVWYZ	1,000	MG		1, 4[1]

(a) Contact-type systems and linear voltage differential transformers (LVDT) therefor, as follows:

(1) Systems having all of the following characteristics:

(i) Range equal to or less than 5 mm;

(ii) Linearity equal to or less than 0.1 percent;

(iii) Drift equal to or less than 0.1 percent per day at standard ambient test room temperatures ±1°C;

(2) Linear voltage differential transformers with no compensation networks and having either of the following characteristics:

[1]The countries to which commodities in this entry are controlled for nuclear reasons are those *not* listed in Supp. No. 2 or Supp. No. 3 to Part 378.

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Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control

Entry No. 1532 (cont.)

(i) Range equal to or less than 5 mm;

(ii) Linearity equal to or less than 0.2 percent (linearity measurements are made in the static mode);

(b) Linear measuring machines, *except optical comparators*, with two or more axes having both of the following characteristics:

(1) Range in any axis greater than 200 mm;

(2) Accuracy (including any compensation) less (finer) than 0.0008 mm per any 300 mm segment of travel;

(c) Angular measuring systems having an accuracy equal to or less than 1 second of arc, *except optical instruments, such as autocollimators, using collimated light to detect angular displacements of a mirror;*

(d) Non-contact type systems having either of the following characteristics:

(1) Effective probe measurement diameter less than 0.5 mm and drift less than 0.5 percent per day at standard ambient test room temperatures ±1°C;

(2) Linearity less than 0.3 percent and drift less than 0.5 percent per day at standard ambient test room temperatures ±1°C;

1533A Radio spectrum analyzers (*i.e.*, apparatus capable of indicating the single-frequency components of multi-frequency signals), specialized components, accessories and parts therefor, as follows (for spectrum analyzers employing time compression of the input signal or FFT techniques, see entry No. 1529 (b)(4)): | ------- | PQSTVWYZ | 1,000 | EE | 1

(a) Non-programmable and capable of operating at frequencies over 12.5 GHz;

(b) Programmable and capable of operating at frequencies over 1 GHz;

(c) Having a display bandwidth in excess of 125 MHz;

(d) Incorporating computing facilities with user accessible reprogramming capability and an alterable memory of more than 8,192 bits;

(e) Having either of the following characteristics for analyzing frequencies greater than 1 GHz:

(1) Including a scanning preselector; or

(2) Incorporating a tracking signal generator;

(f) Having an overall display dynamic range of better than 80 dB; and

(g) Specialized components, accessories, and parts therefor.

1534A Flatbed microdensitometers, *except cathode-ray types*, specially designed parts, components and assemblies therefor, having any of the following characteristics: | No. | PQSTVWYZ | 1,000 | MG | 1, 4[2]

(a) A recording or scanning rate exceeding 5,000 data points per second;

(b) A figure of merit better (less) than 0.1, defined as the product of the density resolution (expressed in density units) and the spatial resolution (expressed in micrometers);

(c) An optical density range greater than 0 to 4.

(Density resolution, expressed in density units, is measured over the optical density range of the instrument.)

[1] Report analyzers in "number."
[2] The countries to which commodities in this entry are controlled for nuclear reasons are those *not* listed in Supp. No. 2 or Supp. No. 3 to Part 373.

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Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control
1537A Microwave equipment, including parametric amplifiers, capable of operating at frequencies over 1 GHz (other than microwave equipment covered by entries No. 1501, 1517, 1520, 1526 I, 1529 and Supplement No. 2 to Part 370), as follows:	-------[1]	PQSTVWYZ	500	EE	1

(a) Rigid and flexible waveguides and components therefor designed for use at frequencies in excess of 18 GHz;

(b) Waveguides having a bandwidth ratio greater than 1.7:1;

(c) Waveguide components, as follows:

(1) Directional couplers having a bandwidth ratio greater than 1.7:1 and directivity over the band of 20 dB or more;

(2) Rotary joints capable of transmitting more than one isolated channel or having a bandwidth greater than 5 percent of the center mean frequency, *except those used in air traffic control equipment carrying combinations of frequencies suitable for secondary surveillance radar antennae co-mounted on a primary radar antenna and which do not have a bandwidth exceeding 5 percent of the center mean frequency;* or

(3) Magnetic including gyro-magnetic waveguide components;

(d) TEM mode device using magnetic including gyro-magnetic properties;

(e) TR and anti-TR tubes and components therefor *except those designed for use in waveguides and having any of the following characteristics, which are in normal civil use for ground or marine radar:*

(i) Operating at a peak power not exceeding 3 MW and at a frequency of 1.5 GHz or less;

(ii) Operating at a peak power not exceeding 1.2 MW and at a frequency over the range of 1.5 GHz to 6 GHz; or

(iii) Operating at a peak power not exceeding 300 kW and at a frequency over the range of 6 GHz to 10.5 GHz;

(f) Assemblies and sub-assemblies in which the isolating base material functions as a dielectric (as used in stripline, microstrip or slotline) *except for those items specifically designed for use in civil television systems to meet ITU standards and using as an isolating material paper base phenolics, glass cloth melamine, glass cloth epoxy resin, polyethylene terephthalate or other isolating material with an operating temperature not exceeding 302°F (150°C);*

(g) Phased array antennae and sub-assemblies, designed to permit electronic control of beam shaping and pointing, and/or specialized parts thereof (including but not limited to duplexers, phase shifters, and associated high speed diode switches); *except duplexers and phase shifters specifically designed for use in civil television systems or in other civil radar or communication systems not covered elsewhere in the Commodity Control List;*

(h) Microwave assemblies and sub-assemblies having circuits fabricated by the same processes used in integrated circuit technology, which include active circuit elements (for acoustic wave devices, see entry No. 1586) (see also entry No. 1564);

(i) Microwave assemblies and sub-assemblies which contain band pass or band stop filters and are capable of operating at 3 GHz or greater;

(j) Amplifiers (see also entry No. 1521);

(k) PIN modulators (see also entry No. 1544); and

(l) Specially designed parts and accessories therefor.

[1] Report equipment in "number."

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Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control
1541A Cathode-ray tubes having any of the following characteristics:	[1]	PQSTVWYZ	500	EE	—
(a) A resolving power of 800 lines or more per inch (32 lines per mm), using the shrinking raster method of measurement;					1
(b) With traveling wave or distributed deflection structure using delay lines, or incorporating other techniques to minimize mismatch of fast phenomena signals to the deflection structure; or					1, 4 [2]
(c) Incorporating microchannel plate electron multipliers; and					1, 4 [2]
(d) Specially designed parts and accessories therefor.					1, 4 [2]
(Specify by name and type number.)					
1541B. Now covered by entry No. 1541.					
1542A Triggered spark-gaps having an anode delay time of 15 microseconds or less and rated for peak current of 3,000 amps or more; specially designed parts therefor; and equipment incorporating such devices. (Triggered spark-gaps are tubes with a structure consisting of two opposed anodes with shapes resembling flattened hemispheres, and with one or more triggering probes placed approximately in the center of one anode. The structure is sealed and contains a mixture of gases, principally nitrogen, under less than atmospheric pressure.) (Specify by name and type number.)	[3]	PQSTVWYZ	500	EE	1, 4
1544A Semi-conductor diodes and dice and wafers therefor, *except those made from germanium, selenium or copper oxide*, designed or rated for use at input or output frequencies above 12.5 GHz or having any of the following characteristics:	[3]	PQSTVWYZ	500	EE	1
(a) Mixer and detector diodes designed or rated for use at input or output frequencies greater than 1 GHz, *except:*					
(i) Point contact diodes designed or rated for use at input or output frequencies of 12.5 GHz or less;					
(ii) Schottky diodes designed or rated for mixer use at input or output frequencies of:					
(a) 3 GHz or less and having a noise figure of more than 6 dB; or					
(b) Greater than 3 GHz and less than 12.5 GHz and having a noise figure of more than 6.5 dB;					
(iii) Schottky diodes designed or rated for detector use at input or output frequencies of less than 12.5 GHz and having a minimum rated tangential sensitivity of either worse than −45 dBm under unbiased conditions or worse than −50 dBm under biased conditions;					
(b) Oscillator and amplifier devices such as Gunn, Impatt, Trapatt, TED and LSA, including those used for the direct conversion of DC to RF power, designed or rated for use at:					
(1) Output frequencies above 1 GHz but not exceeding 4 GHz with a peak power greater than 2 watts or a maximum CW power greater than 200 mW; or					
(2) Output frequencies above 4 GHz but not exceeding 12.5 GHz with a peak power greater than 1 watt or a maximum CW power greater than 100 mW;					

[1] Report tubes in "number."
[2] The countries to which commodities in this entry are controlled for nuclear reasons are those *not* listed in Supp. No. 2 or Supp. No. 3 to Part 373.
[3] Report tubes and semi-conductor devices in "number."

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●	Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control

Entry No. 1544A (cont.)

(c) Voltage variable capacitance diodes designed or rated for use at input or output frequencies greater than 1 GHz;

(d) Fast recovery diodes, as follows:

(1) Having a rated maximum reverse recovery time of less than 1 nanosecond; or

(2) Having both a rated forward rectified current over 1 ampere and a rated maximum reverse recovery time of less than 30 nanoseconds;

(When average reverse recovery time is quoted instead of maximum reverse recovery time, the maximum may be regarded as two times the average.)

(When reverse recovery time is not quoted, diodes rated for a stored charge of less than 25 pico-coulombs shall be regarded as covered, by sub-entry (d) above.)

(Diodes constructed with a rectifying deposited metal semi-conductor junction or barrier, such as hot-carrier or Schottky-barrier diodes, will normally be considered under sub-entries (a) and (d) above. For photodiodes. see entry No. 1548.)

(e) PIN diodes designed or rated for use at input or output frequencies above 1 GHz;

(f) Non-coherent light-emitting diodes with a peak radiant intensity at a wavelength of greater than 1,000 nanometers (for coherent light-emitting diodes, see entry No. 1522); and

(g) Specially designed parts and accessories therefor.

(Specify by name and type number.)

1545A	Transistors and dice and wafers therefor (for phototransistors, see entry No. 1548), as follows:	-------[1]	PQSTVWYZ	500	EE	1

(a) Of any type using a bulk semi-conductor material other than germanium or silicon; or

(b) Using silicon as the bulk semi-conductor material and having any of the following characteristics:

(1) An operating frequency greater than 1 GHz;

(2) An operating frequency of 1.5 MHz or below and a maximum collector dissipation exceeding 300 watts, or an operating frequency greater than 1.5 MHz and a maximum collector dissipation exceeding 250 watts;

(3) An operating frequency greater than 200 MHz and a product of the operating frequency (in GHz) and the maximum collector dissipation (in watts) exceeding 5; or

(4) Majority carrier devices, including but not limited to junction field-effect transistors and metal-oxide semiconductor transistors, *except field-effect transistors having a maximum power dissipation of 500 mW or less and a maximum operating frequency of 1 GHz or less.*

(The maximum operating frequency in Hertz mentioned in sub-entry (b)(4) above is defined as follows:

$$f_{max} = \frac{g_m}{2 \pi C_i}$$

where g_m is the maximum transconductance in Siemens (mho) and C_i is the input capacitance in farads.)

[1] Report tubes and semi-conductor devices in "number."

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Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control
Entry No. 1545 (cont.)					
(The maximum collector dissipation is defined as the continuous dissipation measured under the optimum cooling conditions specified by the manufacturer.)					
(Operating (specification) frequency is defined as the frequency used in measuring output power or power gain (G_{pE}, G_{pB} or G_{pC}). When these parameters are not specified, the operating frequency is defined as the frequency used in measuring gain bandwidth product (f_T) or noise figure.)					
1547A Thyristors and dice and wafers therefor, as follows:	||--------[1]||	PQSTVWYZ	500	EE	1
(a) Designed for use in pulse modulators having a rated turn-on time of less than 1 microsecond where the rated peak current exceeds 150 amperes;					
(b) Having a rated turn-off time of less than 1 microsecond;					
(c) Having a rated turn-off time of from 1 microsecond to less than 2.3 microseconds, *except those having a rated peak current of 50 amperes or less and encapsulated in non-hermetically sealed packages;*					
(d) Having a rated turn-off time of from 2.3 to 10 microseconds and a figure of merit greater than 25 (the figure of merit is defined as the product of the repetitive peak off-state voltage (V DRM) in kilovolts and the repetitive peak on-state current (I TRM) in amperes as shown on the thyristor data sheets); and					
(e) Specially designed parts and accessories therefor.					
(Specify by name and type number.)					
1548A Photosensitive components and dice and wafers therefor, as follows:	||--------[1]||	PQSTVWYZ	500	EE	1
(a) Photosensitive components (including photodiodes, phototransistors, photothyristors, photoconductive cells and similar photosensitive components) with a peak sensitivity at a wavelength longer than 1,200 nanometers or shorter than 190 nanometers; *except germanium photo devices with a peak sensitivity at a wavelength shorter than 1,750 nanometers;*					
(b) Semi-conductor photodiodes and phototransistors with a response time constant of 0.25 microsecond or less measured at the operating temperature for which the time constant reaches a minimum (The time constant is defined as the time taken from the application of a light stimulus for the current increment to reach a value of 1-1/e times the final value (*i.e.*, 63 percent of the final value).); and					
(c) Specially designed parts and accessories therefor.					
(Specify by name and type number.)					
1549A Photomultiplier tubes, as follows:	||--------[1]||	PQSTVWYZ	500	EE	1, 4
(a) For which the maximum sensitivity occurs at wavelengths longer than 0.75 micrometer or shorter than 0.3 micrometer;					
(b) Having an anode pulse rise time of less than 1 nanosecond; or					
(c) Those which contain microchannel plate electron multipliers; and					
(d) Specially designed parts and accessories therefor.					
(Specify by name and type number.)					
1550A Now covered by entry No. 6599.					
1553A Flash discharge type X-ray systems (including tubes) and specially designed parts and accessories therefor, having all of the following characteristics:	||--------[2]||	PQSTVWYZ	500	EE	1, 4

[1] Report tubes and semi-conductor devices in "number."
[2] Report tubes, semi-conductor devices, and systems in "number."

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV & Value Limits TAV	Processing Code	Reason for Control
Entry No. 1553 (cont.)					
(a) Peak power greater than 500 MW;					
(b) Output voltage greater than 500 kV; and					
(c) Pulse width less than 0.2 microsecond.					
1555A[1] Electron tubes and specialized components and parts therefor, *except commercial standard television camera tubes not having fiber optic faceplates and commercial standard X-ray amplifier tubes*, as follows:	[2]	PQSTVWYZ	500	EE	—
(a) Image intensifiers and image converters incorporating fiber optic faceplates and/or microchannel-plate electron multipliers, and camera tubes incorporating or coupled with such intensifiers or converters;[1]					1, 4[3]
(b) Electronic storage tubes, including memory transformers of radar pictures, *except signal converter storage tubes specially designed for television purposes;*					1
(c) Camera tubes with fiber optic faceplates and/or microchannel-plate electron multipliers; or					1, 4[3]
(d) Ruggedized camera tubes having a maximum length-to-bulb diameter ratio of 5:1 or less.					
1556A Optical elements and elements for optical tubes, as follows:	No.	PQSTVWYZ	500	EE	1
(a) Non-flexible fused fiber optic plates or bundles, having all of the following characteristics:					
(1) A fiber pitch (center-to-center spacing) of less than 15 micrometers;					
(2) A light-absorbing medium surrounding each fiber, or interstitially placed between fibers; and					
(3) A diameter greater than ½ in. (13 mm); or					
(b) Microchannel plates for electron image amplification having both of the following characteristics:					
(1) 15,000 or more hollow tubes per plate; and					
(2) Hole pitch (center-to-center spacing) of less than 30 micrometers.					
(Specify by name and type number.)					
1557A Now covered by entry No. 6599.					
1558A Electronic vacuum tubes (valves), and specialized parts, as follows:	[2]	PQSTVWYZ	500	EE	1
(a) Tubes in which space charge control is utilized as the primary functional parameter, including but not limited to triodes and tetrodes, as follows:					
(1) Tubes rated for continuous wave operation having either of the following characteristics:					
(i) Above 4 GHz at maximum rated anode dissipation; or					

[1] The image intensifiers, image converters and camera tubes covered by sub-entry (a) have significant military as well as commercial use, and as such, licensing jurisdiction is shared between the Office of Munitions Control (Department of State) and the Department of Commerce.

[2] Report tubes, semi-conductor devices, and systems in "number."

[3] The countries to which commodities in this entry are controlled for nuclear reasons are those *not* listed in Supp. No. 2 or Supp. No. 3 to Part 373.

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control

Entry No. 1558 (cont.)

(ii) Within the frequency range 0.3 to 4 GHz and for which, under any condition of cooling, the product of the maximum rated anode dissipation (expressed in watts) and the square of the maximum frequency (expressed in GHz) at the maximum rated anode dissipation is greater than 10^4, *except for tubes specially designed for television transmitters operating in the frequency range of 0.47 to 0.96 GHz and rated for operation without a grid current, for which the product of the rated anode dissipation (expressed in watts) and the square of the maximum frequency (expressed in GHz) may reach* 2×10^4;

(2) Tubes rated only for pulse operation having either of the following characteristics:

(i) Above 1 GHz at the peak pulse output power; or

(ii) Between 0.3 and 1 GHz and for which, under any condition of cooling, the product of the peak pulse output power (expressed in watts) and the square of the maximum frequency (expressed in GHz) is greater than 4.5×10^4;

(3) Tubes specially designed for use as pulse modulators for radar or similar applications, having a peak anode voltage rating of 100 kV or more, or rated for a peak pulse power of 6 MW or more (see also entry No. 1514);

(b) Tubes which utilize interaction between a beam of electrons and microwave elements and in which the electrons travel in a direction perpendicular to the applied magnetic field, including but not limited to magnetrons, crossed-field amplifier tubes and crossed-field oscillator tubes, *except:*

(i) Fixed frequency and tunable pulsed magnetrons and crossed-field amplifier tubes which are in normal civil use in equipment which may be exported under the terms of this List as follows:

(1) Magnetrons designed to operate at frequencies below 3 GHz with a maximum rated peak output power of 1.5 MW or less, or between 3 and 12 GHz with the product of the maximum rated peak output power (expressed in kilowatts) and the frequency (expressed in GHz) less than 4,200;

(2) Crossed-field amplifier tubes designed to operate at frequencies below 4 GHz with a maximum rated peak output power of 1.2 MW or less and with less than 15 dB gain;

(ii) Fixed frequency continuous wave magnetrons designed for medical use or for industrial heating or cooking purposes operating at a frequency of 2.375 GHz ± 0.05 GHz or 2.45 GHz ± 0.05 GHz with a maximum rated power not exceeding 6 kW or at a frequency lower than 1 GHz with a maximum rated power not exceeding 25 kW;

(c) Tubes which utilize interaction between a beam of electrons and microwave elements or cavities and in which the electrons travel in a direction parallel to the applied magnetic field, including but not limited to klystrons and traveling wave tubes, *except:*

(i) Continuous wave tubes for use in civil communications designed for octave or lesser bandwidth (where the highest operating frequency is equal to or less than two times the lowest operating frequency) having the following characteristics:

(1) Designed to operate below 20 GHz;

(2) The product of the rated output power (expressed in watts) and the frequency (expressed in GHz) is less than 800;

(ii) Pulsed tubes for civil applications designed for octave or less bandwidth and having either of the following characteristics:

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits TAU	Processing Code	Reason for Control

Entry No. 1558 (cont.)

(1) Peak saturated output power not exceeding 1 kW and average power not exceeding 40 watts at or below 10 GHz;

(2) Peak saturated output power not exceeding 100 watts and average power not exceeding 20 watts between 10 and 20 GHz;

(iii) Pulsed tubes for civil applications designed for fixed frequency operation at frequencies below 3.5 GHz, peak output power of 1.6 MW or less, and operating bandwidth less than 1 percent;

(iv) Low power oscillator tubes designed to operate at frequencies below 20 GHz with maximum output power of less than 3 watts;

(d) Tubes which utilize interaction between an electron beam and microwave elements or cavities but do not require a magnetic field to control or focus the electron beam, *except low power reflex oscillator klystrons designed to operate at frequencies below 20 GHz and at a maximum output power of less than 3 watts;*

(e) Tubes which utilize interaction between a beam of electrons and microwave elements or cavities in which the electrons drift in a direction parallel to the applied magnetic field but also require for their operation a large component of velocity transverse to the direction of the applied magnetic field, including but not limited to gyrotrons and ubitrons;

(f) Tubes designed to withstand on any axis an acceleration of short duration (shock) greater than 1,000 g;

(g) Valves designed for operation in ambient temperatures exceeding 200°C;

(h) Tubes of types described in sub-entries (c), (d), or (e) which are designed to operate with no cathode heating element; or

(i) Tubes which utilize a modulated beam of electrons striking one or more semi-conductor diodes to provide power gain (see also entry No. 1544).

(Specify by name and type number.)

1559A Hydrogen thyratrons of ceramic-metal construction rated for a peak pulse power output of 12.5 MW or more; and specially designed parts and accessories therefor. (Specify by name and type number.)	-------[1]	PQSTVWYZ	500	EE	1, 4
1560A[2] Capacitors designed for and/or capable of maintaining their rated electrical and mechanical characteristics during their specified operating lifetime, as follows:	-------[1]	PQSTVWYZ	500	EE	1

(a) Monolithic ceramic capacitors rated for operation over the whole range of ambient temperatures from below −55°C to above +125°C;

(b) Tantalum electrolytic capacitors rated for operation at ambient temperatures exceeding +125°C, *except sintered electrolytic types having a casing made of epoxy resin or which are sealed or coated with epoxy resin;* and

(c) Specially designed parts and accessories therefor.

(Specify by name and type number.)

1561A Materials specially designed and manufactured for use as absorbers of electromagnetic waves having frequencies greater than 2×10^9 Hz, and less than 3×10^{12} Hz, *except materials having the following characteristics:*	Lb.	PQSTVWYZ	1,000	EE	1

[1] Report tubes and semi-conductor devices in "number."

[2] Exports of capacitors rated for operation during their specified lifetime at ambient temperatures below −55°C or above +200°C are controlled by U.S. Department of State, Office of Munitions Control.

Export Control Commodity Number / Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control

Entry No. 1561 (cont.)

(i) A tensile strength of less than 7×10^7 N/m² (10,157 psi) and a compressive strength of less than 17.5×10^7 N/m² (25,392 psi);

(ii) Not capable of withstanding temperatures in excess of 176°C (350°F).

1564A Electronic component assemblies, sub-assemblies, printed circuit boards, and microcircuits:	No.	PQSTVWYZ	500	EE	1

I. Defined as follows:

(a) Assembly	A number of components *(i.e.,* circuit elements, discrete components, microcircuits) connected together to perform a specific function or functions, replaceable as an entity (and normally capable of being disassembled).
(b) Microcircuit	A device in which a number of passive and active circuit elements are considered as indivisibly associated on or within a continuous structure to perform the function of a circuit.
(c) Monolithic integrated circuit	A microcircuit fabricated as a single component consisting of elements formed in or on a single semiconducting substrate by diffusion, implantation or deposition.
(d) Film type microcircuit	An array of circuit elements and metallic interconnections formed by deposition of a thick or thin film on an insulating substrate.
(e) Multichip microcircuit	A microcircuit containing two or more monolithic integrated circuit chips bonded to a common substrate.
(f) Hybrid microcircuit	A microcircuit consisting of a combination of film-type microcircuits and monolithic integrated circuit elements or combinations of either with discrete components and/or circuit elements.
(g) Circuit element	A single active or passive functional item in an electronic circuit, such as one diode, one transistor, one resistor, one capacitor.
(h) Discrete component	A separately packaged circuit element with its own external connections.
(i) Integrated optical microcircuit	A microcircuit containing one or more elements designed to function as a photosensor and/or photo-emitter.
(j) Module	An assembly, replaceable as an entity, not normally capable of being disassembled.
(k) Microprocessor microcircuit	A single package (normally single-chip) electronic logic unit capable of executing from external memory a series of general purpose instructions contained in the external memory. (The unit normally does not contain integral user memory, although internal memory on the chip may be present for internal utilization by the chip in performing its logic function. User memory is customarily provided via external memory chips, although some products have some limited onboard memory that is normally used for purposes other than program storage.)
(l) Microcomputer microcircuit	An electronic logic unit capable of executing instructions from internal memory, on data contained in the internal memory. (In certain cases the internal memory may be augmented by an external memory.)

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control

Entry No. 1564 (cont.)

II. Listed as follows:

(a) Printed circuit boards (single sided, double sided, or multilayer) designed to mount and provide interconnection between electronic components, *except those manufactured from any of the following insulating materials:*

(i) Paper base phenolics;

(ii) Glass cloth melamine;

(iii) Glass epoxy resin;

(iv) Polyethylene terephthalate; or

(v) Any insulating material with a maximum continuous rated operating temperature not exceeding 150° C;

(b) Assemblies, modules and printed circuit boards with mounted components, as follows:

(1) Those including printed circuit boards covered by sub-entry II(a) above;

(2) Those which contain microprocessor, microcomputer of memory microcircuits or embargoed components, *except:*

(i) Assemblies, not containing microprocessor, microcomputer or memory microcircuits, whose only embargoed components are capacitors;

(ii) Power supply assemblies;

(Sub-entry II(b)(2) above does not cover assemblies, modules and printed circuit boards with mounted components designed for equipment (other than electronic computers and related equipment) not otherwise embargoed, and which, by nature of their design, performance, lack of user-accessible programmability and software, microprogram control, or specialized logic control, are substantially restricted to the particular application for which they have been designed.)

(Assemblies, modules and printed circuit boards with mounted components which are designed for, or which have the same functional characteristics as, embargoed equipment shall be rated against the parameters of the appropriate equipment item, except that, in such cases, the temperature parameter will be below −55°C and above +85°C.)

(For assemblies, modules and printed circuit boards with mounted components which are designed for, or which have the same functional characteristics as, electronic computers or related equipment, see entry No. 1565.)

(c) Microcircuits (monolithic integrated circuits, microprocessor, microcomputer, multichip, hybrid, film or integrated optical types), *except:*

(i) Encapsulated passive networks (technology for the manufacture of thin-film passive networks is not released by this sub-entry); or

(ii) Encapsulated microcircuits which are not designed or rated as radiation hardened, which are not rated for operation below −40°C or above +85°C, which are packaged in TO-5 outline cases (0.305 inch to 0.370 inch diameter) or in non-hermetically sealed cases and which are:

(1) Bipolar types designed for operation as digital logic circuit elements but limited to gates, inverters, buffers, bilateral switches, drivers, counters, latches, adders, comparators, parity generators, multiplexers, expanders, flip-flops, multivibrators, code converters, registers, encoders, decoders, demultiplexers, diode matrices, multipliers and Schmitt-triggers, and having all of the following characteristics:

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control

Entry No. 1564 (cont.)

(a) A product of the typical basic gate propagation delay time, in nanoseconds, and the power dissipation per basic gate, in milliwatts, not less than 30 pJ (i.e., speed-power product/gate not less than 30 pJ);

(b) A typical propagation delay time not less than 8 nanoseconds; and

(c) Encapsulated in a package having 24 terminals or less;

(2) CMOS types designed for operation as digital logic circuit elements but limited to gates, inverters, buffers, flip-flops, latches, multivibrators, bilateral switches, display drivers, fixed counters, fixed frequency dividers, storage registers, decoders, voltage translators, encoders and Schmitt-triggers, and having both of the following characteristics:

(a) A minimum propagation delay time under any rated conditions of not less than 10 nanoseconds;

(b) Encapsulated in a package having 24 terminals or less;

(3) Silicon single-chip microcomputer microcircuits that are mask programmed for a civil application prior to export and having all of the following characteristics:

(a) A word size/speed ratio of less than or equal to 0.4 bit per microsecond;

(b) A speed-power dissipation product of greater than or equal to 4 microjoules;

(c) An on-chip read-only memory (ROM), not including the microcode, of less than or equal to 2,048 bytes;

(d) An on-chip random-access memory (RAM) of less than or equal to 512 bits;

(e) An operand (data) word length of less than or equal to 8 bits;

(f) Not capable of addressing off-chip program memory;

(g) Not rated for operation below −20°C or above +75°C;
(Speed is defined as the time (in microseconds) to add C to D where C and D are both in memory, and put the result back in C.) (Bit-slice microcomputers are not released by this sub-entry.)

(4) Silicon microprocessor microcircuits having all of the following characteristics:

(a) A word size/speed ratio of less than or equal to 0.4 bit per microsecond;

(b) A speed-power dissipation product of greater than or equal to 4 microjoules;

(c) Containing no on-chip ROM or on-chip RAM;

(d) An operand (data) word length of less than or equal to 8 bits;

(e) Capable of addressing off-chip program memory of less than or equal to 32,768 bytes;

(f) Not rated for operation below −20°C or above +75°C;
(Speed is defined as above (3g). Bit-slice microprocessors are not released by this sub-entry.)

(5) Memory microcircuits as follows:

(a) MOS dynamic RAM's having all of the folowing characteristics:

(i) A maximum number of bits per package of 1,024 bits and an access time of no less than 250 nanoseconds;

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Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits TSV	Processing Code	Reason for Control

Entry No. 1564 (cont.)

(ii) Not rated for operation below −20°C or above +75°C;

(b) Mask programmed ROM's not rated for operation below −20°C or above +75°C, as follows:

(i) With a maximum number of bits per package of 2,048 bits and an access time of no less than 450 nanoseconds;

(ii) PMOS or NMOS types with a maximum number of bits per package of 4,096 bits and an access time of no less than 700 nanoseconds;

(c) MOS static RAM's having both of the following characteristics:

(i) A maximum number of bits per package of 256 bits;

(ii) An access time of no less than 450 nanoseconds;

(d) Bipolar RAM's as follows:

(i) With a maximum number of bits per package of 64 bits and an access time of no less than 30 nanoseconds;

(ii) With a maximum number of bits per package of 256 bits and an access time of no less than 40 nanoseconds;

(iii) With a maximum number of bits per package of 1,024 bits and an access time of no less than 45 nanoseconds;

(6) (a) Non-reprogrammable microcircuits, not capable of addressing external memory, specially designed for, and which by virtue of circuit design are normally limited to use only for simple calculators which perform a single function in response to a keystroke, capable of performing a floating point addition of 13 decimal digits (mantissa only) or less in no less than 0.02 second;

(b) Programmable microcircuits specially designed for, and which by virtue of circuit design are normally limited to use only for simple key programmable calculators having both of the following characteristics:

(i) Capable of executing a sequence of no more than 256 program steps introduced into a program memory on the chip by a sequence of keystrokes;

(ii) Capable of performing a floating point addition of 13 decimal digits (mantissa only) or less in no less than 0.02 second;

(c) P-channel or N-channel MOS microcircuits specially designed as, and which by virtue of circuit design are normally limited to use only as, serial digital shift registers with a maximum clock rate of 2.5 MHz, and a maximum number of bits per package of 1,024;

(7) (a) Untuned AC amplifier microcircuits having a bandwidth of less than 3 MHz and a maximum rated power dissipation of 5 Watts or less at a case temperature of 25°C;

(b) Audio amplifier microcircuits having a maximum rated continuous power output of 25 Watts or less at a case temperature of 25°C;

(8) Operational amplifier microcircuits having all of the following characteristics:

(a) A typical unity-gain open-loop bandwidth of not more than 5 MHz;

(b) A typical open-loop voltage gain of not more than 500,000 or 115 dB;

(c) A maximum intrinsic rated input offset voltage of not less than 2.5 mV; and

(d) A typical slew rate at unity gain not exceeding 2.5 Volts/microsecond;

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits TSV	Processing Code	Reason for Control

Entry No. 1564 (cont.)

(9) Analog multiplier and/or divider microcircuits having both of the following characteristics:

(a) A best case rated non-linearity of not better than 0.5 percent of full scale;

(b) A −3 dB small-signal bandwidth of not more than 500 kHz;

(10) Isolation amplifier microcircuits;

(11) Instrumentation amplifier microcircuits having all of the following characteristics:

(a) A best case rated non-linearity of not better than 0.02 percent at a gain of 100;

(b) A maximum gain-bandwidth product not greater than 5 MHz (e.g., a maximum bandwidth of 50 kHz at −3 dB and at a gain of 100);

(c) A typical slew rate at unity gain not exceeding 1 volt/microsecond;

(12) Voltage regulator microcircuits, as follows:

(a) Linear types, having both of the following characteristics:

(i) A rated nominal output voltage of 40 volts or less;

(ii) A maximum output current of 1 A or less;

(b) Switching types, having both of the following characteristics:

(i) A rated nominal output voltage of 40 volts or less;

(ii) A maximum output current of 150 mA or less;

(For voltage regulators, the +85°C upper temperature limit specified in II(c)(ii) is not applicable. The lower limit of −40°C is applicable.)

(13) Voltage comparator microcircuits, having both of the following characteristics:

(a) A maximum input offset voltage of not less than 2 mV; and

(b) A typical switching speed or typical response time of not less than 30 nanoseconds;

(14) Bipolar microcircuits designed for operation in civil applications as externally controlled (by inductive, magnetic or optical means) electronic switches, or as threshold value switches with switching times of 0.5 microsecond or greater;

(15) Non-coherent light-emitting alphanumeric displays not incorporating an integrated circuit;

(16) Non-coherent light-emitting alphanumeric displays incorporating an integrated circuit used for decoding, controlling and/or driving that display, provided that the integrated circuit is not integral with the actual display device;

(17) Simple encapsulated photo-coupler (transoptor) assemblies with electrical input and output and which incorporate non-coherent light-emitting diodes;

(18) Interface microcircuits, as follows:

(a) Line drivers and line receivers having a typical propagation delay time from data input to output of not less than 15 nanoseconds;

(b) Sense amplifiers, having both of the following characteristics:

(i) A typical propagation delay time from data input to output of not less than 15 nanoseconds;

(ii) A typical input threshold voltage of not less than 10 millivolts;

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits TAV	Processing Code	Reason for Control

Entry No. 1564 (cont.)

(c) Memory and clock drivers, having all of the following characteristics:

(i) A maximum rated output current of 500 milliamperes or less;

(ii) A maximum rated output voltage of 30 volts or less;

(iii) A typical propagation delay time from data input to output of not less than 20 nanoseconds;

(d) Peripheral and display drivers, having all of the following characteristics:

(i) A maximum rated output current of 500 milliamperes or less;

(ii) A typical propagation delay time from data input to output of not less than 20 nanoseconds;

(iii) A maximum rated output voltage of 30 volts or less;

(When propagation delay time is not specified, typical turn-on or turn-off time, whichever is less, should be used.)

(19) Voltage-to-frequency converter microcircuits not employing delta or delta/sigma modulation techniques, having both of the following characteristics:

(a) A rated non-linearity of not better than 0.01 percent of full scale;

(b) A settling/response time of not less than 20 microseconds for a full scale input change;

(20) Rms-to-dc voltage converter microcircuits having both of the following characteristics:

(a) A rated conversion accuracy, with or without external adjustment, of not better than 0.2 percent of full scale;

(b) A ± 1 percent amplitude error bandwidth of not greater than 100 kHz;

(21) Analog-to-digital and digital-to-analog converter microcircuits as follows:

(a) Analog-to-digital converter microcircuits having both of the following characteristics:

(i) A conversion time to maximum resolution of not less than 20 microseconds;

(ii) A rated non-linearity of not better than 0.05 percent of full scale over the specified operating temperature range;

(b) Digital-to-analog converter microcircuits having both of the following characteristics:

(i) A settling time to rated linearity of not less than 5 microseconds for "voltage output," and not less than 300 nanoseconds for units not incorporating an output amplifier;

(ii) A rated non-linearity of not better than 0.05 percent of full scale over the specified operating temperature range;

(This sub-entry is not intended to release coder, decoder or coder/decoder (codec) microcircuits specially designed for voice.)

(See entry No. 1527.)

(22) Non-reprogrammable microcircuits which are specially designed for and by virtue of circuit design are normally limited to use for functional purposes in the following applications:

(a) Automotive, including safety, comfort, operations and pollution;

(b) Home electronics, including radio and television, appliances, clocks, watches, audio and video tape recorders, safety, comfort and amusement;

(c) Personal communications up to 150 MHz, including amateur radio communications and intercom;

(d) Unembargoed cameras (including cine cameras) but excluding imaging microcircuits;

(e) Cardiac pacemakers;

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control

Entry No. 1564 (cont.)

(A microcircuit whose function cannot be altered by accepting or executing instructions from any external source is non-reprogrammable.)

(Programmed microcircuits are only eligible for release from embargo if the program is unalterably stored at the time of manufacture and the performance of the function has been established for the intended end-use.)

(The temperature limits specified in the heading of II(c)(ii) above do not apply to subsections II(c)(ii)(22)(a) or d).)

(23) Timing microcircuits having both of the following characteristics:

(a) A typical timing error of not less than 0.5 percent;

(b) A typical rise time of not less than 100 nanoseconds;

(iii) Unencapsulated monolithic integrated circuits which are not designed or rated as radiation hardened, and which are:

(1) Bipolar types designed for operation as digital logic circuit elements but limited to gates, inverters, buffers, bilateral switches, drivers, counters, latches, adders, comparators, parity generators, multiplexers, expanders, flip-flops, multivibrators, code converters, registers, encoders, decoders, demultiplexers, diode matrices, multipliers and Schmitt-triggers, and having both of the following characteristics:

(a) A product of the typical basic gate propagation delay time (in nanoseconds) and the power dissipation per basic gate (in milliwatts) not less than 70 pJ (i.e., speed-power product/gate not less than 70 pJ);

(b) A typical propagation delay time not less than 5 nanoseconds;
(This entry does not permit export of complex custom bipolar digital devices.)

(2) Operational amplifiers, having all of the following characteristics:

(a) A typical unity-gain open-loop bandwidth of not more than 5 MHz;

(b) A typical open-loop voltage gain of not more than 100,000 or 100 dB;

(c) A maximum intrinsic rated input offset voltage of not less than 5 mV;

(d) A typical slew rate at unity gain not exceeding 1 volt/microsecond;

(3) Audio amplifiers having a maximum rated power output of 10 watts or less at a case temperature of 25°C;

(4) Non-reprogrammable types which are specially designed for and by virtue of circuit design are normally limited to civil uses in television and radio receivers, having all of the following characteristics:

(a) Rated for operation at 11 MHz or less;

(b) Not specially designed for station scanning applications;

(c) Not utilizing charge-coupled device (CCD) technology;

(d) Not intended for beam lead bonding;

(e) Not intended for video and/or luminance amplifiers with maximum rated supply voltages exceeding 30 volts or with typical bandwidths greater than 7.5 MHz.

(Nothing in the above shall be construed as sanctioning the export of wafer or chip design or processing information inherent in the manufacture of any embargoed class of assembly, sub-assembly, microcircuit or circuit element, irrespective of any release of devices in that class. This restriction also applies to technology embodied both in the equipment covered by entry No. 1355 and in its use.)

(Specify by name and type number.)

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Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits TAV	Processing Code	Reason for Control
1565A Electronic computers and related equipment, as follows:	-------[1]	PQSTVWYZ	1,000	CD	1, 3[2], 4[3]

(a) Analog computers designed or modified for use in airborne vehicles, missiles or space vehicles and rated for continuous operation at temperatures from below −45°C to above +55°C; and equipment or systems incorporating such computers;

(b) Other analog computers capable of accepting, processing and putting out data in the form of one or more continuous variables and capable of incorporating a total of at least 20 summers, integrators, multipliers or function generators with facilities for readily varying the interconnection of these components;

(c) Digital computers and digital differential analyzers (incremental computers), as follows:

(1) Designed or modified for use in airborne vehicles, missiles, or space vehicles and rated for continuous operation at temperatures from below −45°C to above +55°C;

(2) Designed or modified to limit electromagnetic radiation to levels much less than those required to meet appropriate government civil interference specifications;

(3) Designed as ruggedized equipment and capable of meeting military specifications for ruggedized equipment or modified for military use;

(4) Designed or modified for "data (message) switching" or those incorporating equipment, devices, or techniques, including software, microprogram control (firmware) and/or specialized logic control (hardware), for accepting, storing, processing and retransmitting data groups ("Data (message) switching" is the technique (including but not limited to store and forward or packet switching) for accepting data groups (including messages, packets or other digital or telegraphic information groups that are transmitted as a composite whole), storing (buffering) data groups as necessary, processing part or all of the data groups for control (routing, priority, formatting, code conversion, error control, retransmission or journaling), transmission or multiplexing purposes as necessary, and retransmitting (processed) data groups when transmission and/or receiving facilities are available); and

(5) Equipment or systems incorporating such computers;

(d) Digital computers with one or more of the following characteristics:

(1) Floating point operations are implemented by hardware or microprogram control (firmware);

(2) The computer is equipped with peripherals (other than those free from control under sub-entry (h) below);

(3) The computer is equipped with cathode-ray tube or other displays (other than those free from control under sub-entry (h) below), as follows:

(i) Used to display alphanumeric, graphic and/or similar data or information; or

(ii) With light gun or other graphic input devices;

(e) Other digital computers operated by one or more common control units and capable of all of the following:

(1) Accepting, storing, processing and producing an output in numerical or alphabetical form;

(2) Storing in fixed or alterable (writable) storage devices more than 512 numerical and/or alphabetical characters or having an internal fixed or alterable memory of more than 2,048 bits;

(3) Performing a stored sequence of operations that are modifiable by means (including replacement of fixed storage devices) other than a physical change in wiring or interconnections; and

[1] Report computers and peripherals in "number."
[2] Foreign policy export controls apply only to computer equipment destined for government consignees in the Republic of South Africa and Namibia, excluding those described under 1565A Note 7 in Supp. No. 1 to Part 385.
[3] Nuclear related controls are described in § 399.2, Commodity Interpretation No. 1.

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV & Value Limits T&V	Processing Code	Reason for Control

Entry No. 1565 (cont.)

(4) Selecting a sequence from a plurality of stored operations based upon data or an internally computed result;

(f) Computers capable of operating both analog and digital modes and related equipment, as follows:

(1) Equipment whose analog portion meets the conditions of sub-entry (b) and whose digital portion meets the conditions of sub-entry (e) and which also provides facilities for processing in the digital section numeric data from the analog section and/or vice versa;

(2) Equipment for interconnecting the analog and digital portions of computers as defined in sub-entry (f)(1); and

(3) Digital or analog computers containing interconnecting equipment as defined in sub-entry (f)(2);

(g) Related equipment for the above (including that also described in entry Nos. 1572 and 1588), designed or modified as described in sub-entries (a) or (c), *i.e.*, specialized parts, components, peripherals, displays, sub-assemblies, accessories, and spare parts; and

(h) Other related equipment for the above (including that also described in entry Nos. 1572 and 1588), *i.e.*, specialized parts, components, peripherals, displays, sub-assemblies, accessories, and spare parts.

This sub-entry (h) does not control the following digital computer peripherals or displays unless they are controlled by sub-entry (g). However, this does not remove from control interface or control units for the following or any of the following entries which incorporate equipment otherwise controlled by this entry No. 1565 or which are also described in entry Nos. 1572 and 1588:

(1) Peripherals, as follows:

(i) Punched card readers capable of operating at a speed not exceeding 2,000 cards per minute and punched card punches;

(ii) Paper tape readers capable of operating at a speed not exceeding 2,000 characters per second and paper tape punches;

(iii) Manually operated keyboards including teletype input devices; and

(iv) Non-impact printers capable of operating at a speed not exceeding 2,500 characters per minute, impact line printers and impact character printers;

(2) Displays, as follows:

(i) Cathode-ray tube displays for which circuitry and character-generation devices external to the tube limit displays to alphanumeric characters in fixed formats or to graphs composed only of the same basic elements as used for alphanumeric character composition (limited to graphic displays for which the sequence of symbols and basic elements of symbols are fixed by the format and character generators in the unit and cannot be generated arbitrarily by the computer);

(ii) With light gun or other graphic input devices which are parts of the above cathode-ray tube displays;

(iii) Cathode-ray tube displays (excluding those displays which use cathode-ray tubes controlled by entry No. 1541) which are part of industrial or medical equipment and which are not specially designed for computer use;

(iv) Non-coherent visible-spectrum light-emitting diode displays not controlled by entry No. 1544;

(v) Nixie-type tube displays; and

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Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control
Entry No. 1565 (cont.)					
(vi) Other displays for which circuitry and character-generation devices external to the display device (panels, tubes, etc.) and the construction of the display device limit displays to alphanumeric characters in fixed formats or to graphs composed only of the same basic elements as used for alphanumeric character composition (limited to graphic displays for which the sequence of symbols and basic elements of symbols are fixed by the format and character generators in the unit and by the display device and cannot be generated arbitrarily by a computer or other control device). This subparagraph does not remove from control displays or display devices having circuitry or non-mechanical character-generation devices integral with the display device, or having any of the following characteristics:					
(a) An area of 1,200 sq. cm. or less and a minimum character height of less than 8 mm;					
(b) An area greater than 1,200 sq. cm. and a minimum character height of less than 20 mm; or					
(c) A capability of displaying more than 3 levels (off, intermediate and full on); and					
(vii) Specialized parts, components, sub-assemblies, accessories, and spare parts for the above.					
(Specify by name and model number. Also see § 376.10.)					
5565D Equipment, n.e.s., containing or incorporating an array transform processor (for example, nuclear magnetic reasonance analyzers, biomedical analyzers, X-ray scanner/analyzers, simulator systems, auto visual inspection systems, vibration and noise analyzers, and nuclear particle/emission analyzers). (Array transform processors and parts therefor, when exported alone or as spares or replacements are controlled by entry No. 1565.)	----------[1]	PQSWYZ and Afghanistan	—	CD	1
1568A Equipment as follows:	----------[1]	PQSTVWYZ	1,000	—	—
(a) All classes of devices, regardless of other characteristics, identified in sub-entries (b), (c), (d), (e), (f), (g), (j), and (k) below, which are designed to operate below −55°C or above +125°C;				MG	1
(b) Synchros and resolvers (and special instruments rated to have the same characteristics as synchros and resolvers in (1) and (2) below, such as Microsyns, Synchro-Tels and Inductosyns), possessing any of the following characteristics:				MG	1, 4[2]
(1) A rated electrical error of 7 minutes of arc or less or of 0.2 percent or less of maximum output voltage;					
(2) A rated dynamic accuracy for receiver types of 1° or less, except that for units of size 30 (3 inches (76.2 mm) in diameter) or larger a rated dynamic accuracy of less than 1°;					
(3) Multi-speed from single shaft types; or					
(4) Designed for gimbal mounting;					
(c) Amplifiers, electronic or magnetic, specially designed for use with resolvers, the following:				EE	1
(1) Isolation types having a variation of gain constant (linearity of gain) of 0.2 percent or better;					
(2) Summing types having a variation of gain constant (linearity of gain) or an accuracy of summation of 0.2 percent or better; or					
(3) Employing solid state Hall effect;					

[1] Report instruments and equipment in "number."
[2] The countries to which commodities in this entry are controlled for nuclear reasons are those not listed in Supp. No. 2 or Supp. No. 3 to Part 378.

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control
Entry No. 1568 (cont.)					
(d) Induction potentiometers (including function generators and linear synchros), linear and non-linear, possessing any of the following characteristics:		MG	||		1, 4[1]
(1) A rated conformity of 0.25 percent or less, or of 13 minutes of arc or less;					
(2) Employing solid state Hall effect; or					
(3) Designed for gimbal mounting;					
(e) Induction rate (tachometer) generators, synchronous and asynchronous, as follows:		MG	||		1
(1) Employing solid state Hall effect;					
(2) With a housing diameter of 2 inches (50.8 mm) and smaller and a length (without shaft ends) of 4 inches (101.6 mm) and smaller or with a diameter-to-length ratio greater than 2:1, having one or more of the following characteristics:					
(i) With a rated linearity of 0.1 percent or less; or					
(ii) All temperature-compensated or temperature-corrected types;					
(f) Servo-motors (gear-head or plain) as follows:		MG	||		1, 4[1]
(1) Designed to operate from power sources of more than 300 Hz, *except those designed to operate from power sources of over 300 Hz up to and not exceeding 400 Hz with a temperature range of from −55°C to +125°C;*					
(2) Designed to have a torque-to-inertia ratio of 50,000 radians per second^2 or greater;					
(3) Incorporating special features to secure internal damping; or					
(4) Employing solid state Hall effect;					
(g) Precision potentiometers, *except potentiometers using only switched elements* (for the purpose of this sub-entry, a precision potentiometer means one having a rated conformity better than 0.25 percent for a linear potentiometer; or 1 percent for a non-linear potentiometer), and special instruments rated to have the same characteristics as potentiometers in (1) and (2) below, such as Vernistats, as follows:		MG			1, 4[1]
(1) Linear potentiometers having a constant resolution and a rated linearity of better than 0.05 percent absolute;					
(2) Non-linear potentiometers having a variable resolution and a rated conformity of:					
(i) 1 percent or less when the resolution is inferior to that obtained with a linear potentiometer of the same type and of the same track length; or					
(ii) 0.5 percent or less when the resolution is better than or equal to that obtained with a linear potentiometer of the same type and of the same track length; or					
(3) Designed for gimbal mounting;					
(h) Direct current and alternating current torquers, *i.e.*, torque motors specially designed for gyros and stabilized platforms;		MG	||		1
(i) Electro-optical devices designed to monitor relative rotation of remote surfaces;		MG	||		1
(j) Synchronous motors, as follows:		MG	||		1, 4[1]

[1] The countries to which commodities in this entry are controlled for nuclear reasons are those *not* listed in Supp. No. 2 or Supp. No. 3 to Part 373.

Commodity Control List—399.1 Group 5 CCL-59

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control
Entry No. 1568 (cont.)					
(1) Of size 20 (2 in. (50.8 mm) in diameter) and smaller and having synchronous speeds in excess of 3,600 rpm;					
(2) Designed to operate from power sources of more than 400 Hz;					
(k) Analog-to-digital and digital-to-analog converters other than digital voltmeters or counters (see entry No. 1529), as follows:		EE	||		1, 4[1]
(1) Electrical input type analog-to-digital converters having any of the following characteristics:					
(i) A peak conversion rate in excess of 200,000 complete conversions per second;					
(ii) An accuracy in excess of 1 part in more than 10,000 of full scale; or					
(iii) A figure of merit of 1×10^6 or more (derived from the number of complete conversions per second divided by the accuracy);					
(2) Electrical input type digital-to-analog converters having any of the following characteristics:					
(i) A setting time (the time required for the output to come within one half bit of the final value when switching between any two levels of the converters) of less than 5 microseconds for voltage input devices and less than 500 nanoseconds for current input devices;					
(ii) An accuracy in excess of 1 part in more than 10,000 of full scale;					
(iii) A figure of merit of 1×10^6 or more (the figure of merit is derived as in (1)(iii) above);					
(3) Solid-state synchro-to-digital or digital-to-synchro converters and resolver-to-digital or digital-to-resolver converters (including multipole resolvers) having a resolution of better than ± 1 part in 5,000 per full synchro revolution for single speed synchro systems or ± 1 part in 40,000 for dual speed systems;					
(4) Mechanical input types (including but not limited to shaft-position encoders and linear displacement encoders, but excluding complex servo-follower systems), as follows:					
(i) Rotary types having an accuracy of better than ± 1 part in 40,000 of full scale; or					
(ii) Linear displacement types having a resolution better than ± 5 micrometers;					
(l) Semi-conductor Hall field probes, as follows:		EE	||		1
(1) Made of indium-arsenide-phosphide (In As P);					
(2) Coated with ceramic or ferritic materials (*e.g.*, special field probes such as tangential field probes, multipliers, modulators, recorder probes, etc.); or					
(3) With an open circuit sensitivity greater than $0.12 \left(\frac{\text{Volts}}{\text{Amperes} \times \text{Kilogauss}}\right)$					
(Open circuit sensitivity is the slope of a straight line that passes through the point of origin and through the point V_{so}; i_1 at $B = B_n$ in the characteristic is defined as the open circuit sensitivity. V_{so} = Hall voltage, open circuit; i_1 = Control current; B_n = Rated value of applied magnetic control field); and					
(m) Specially designed parts, components, sub-assemblies, and test equipment (including adapters, couplers, etc.) for the above.		EE, MG[2]	||		1, 4[1]
(Specify by name and type or model number.)					

[1] The countries to which commodities in this entry are controlled for nuclear reasons are those *not* listed in Supp. No. 2 or Supp. No. 3 to Part 373.
[2] Processing code for this sub-entry is the same as that of the equipment for which the parts, etc., are designed.

CCL-60 Group 5 Commodity Control List—399.1

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control
4568B Now covered by entry No. 1529(g).					
5568D [1] Equipment, as follows:	--------	PQSWYZ [1] and Afghanistan	—[2]	MG	1
(a) Synchronous motors of any rating having any of the following characteristics:					
(1) Synchronous speeds in excess of 3,000 rpm,					
(2) Designed to operate between −55°C and −10°C, or between +55°C and +125°C,					
(3) Of size 11 (1.1 inches in diameter) or smaller, or					
(4) Larger than size 20 (2 inches in diameter) having synchronous speeds in excess of 3,600 rpm;					
(b) Servo control units, linear induction potentiometers, induction rate generators, synchros, and resolvers; and instruments which perform functions similar to synchros or resolvers with a rated electrical error of greater than 7 minutes of arc, or between 0.2 percent and 0.5 percent of maximum output voltage;					
(c) 'Induction potentiometers (including function generators and linear synchros), linear and nonlinear, of size 11 (1.1 inches in diameter) or smaller, or having a rated conformity between 0.25 percent and 0.5 percent, or of more than 13 minutes to 18 minutes;					
(d) Induction rate (tachometer) generators, synchronous and asynchronous, of size 11 (1.1 inches in diameter) or smaller, or with a housing diameter of 2 inches and smaller and a length (without shaft-ends) of 4 inches and smaller, or with a diameter-to-length ratio greater than two to one, having a rated linearity between 0.1 percent and 0.5 percent; and					
(e) Parts and accessories therefor.					
(Specify by name and model number.)					
4569B Inverters, converters, frequency changers, and generators having a multiphase electrical power output within the range of 600 to 2,000 hertz.	--------	PQSTVWYZ and Canada	0	EE	4
1570A Thermoelectric materials and devices, as follows:	--------	PQSTVWYZ	250	EE	—
(a) Thermoelectric materials with a maximum product of the figure of merit (Z) and the temperature (T in °K) in excess of 0.75;					1, 4 [3]
(b) Junctions and combinations of junctions using any of the materials in (a) above;					1
(c) Heat absorbing and/or electrical power generating devices containing any of the junctions in (b) above;					1
(d) Other power generating devices which generate in excess of 10 watts per pound or of 500 watts per cubic foot of the device's basic thermoelectric components; and					1, 4 [3]
(e) Specialized parts, components, and sub-assemblies for the above devices.					1, 4 [3]
(The figure of merit (Z) equals Seebeck coefficient squared divided by the product of electrical resistivity and thermal conductivity. The weight and cubic measurements in (d) above are not intended to encompass the complete device but to include only the thermoelectric elements and assembly and the components for pumping calories. Other components, such as heating and/or cooling sources or containers, device frames or stands and control equipment are not to be included in the calculations.) (See also entry No. 1205 sub-entry (c).)					
(Specify by name and model number.)					

[1] A validated license also is required for export to the Republic of South Africa and Namibia if intended for delivery to or for use by or for military or police entities in these destinations or for use in servicing equipment owned, controlled, or used by or for these entities. See § 371.2(c)(11) and § 385.4(a).

[2] The GLV $ value limit for Country Group Q is $100.

[3] The countries to which commodities in this entry are controlled for nuclear reasons are those not listed in Supp. No. 2 or Supp. No. 3 to Part 373.

Commodity Control List—399.1 Group 5 CCL-61

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control
1571A Magnetometers having or capable of having a sensitivity better than ±1.0 gamma ($\pm 10^{-5}$ oersteds), and specially designed parts therefor. (Sensitivity is defined as the visually recognized minimum sinusoidal signal in the frequency range of 0.025 Hz to 1.5 Hz when signal-to-noise ratio is higher than 1. Specially designed parts therefor is intended to include active rotational compensation as opposed to static compensation methods, and any form of dynamic signal processing or gradient compensation provided as part of, or designed for use with, magnetometers included in this entry.)	---[1]	PQSTVWYZ	500	MG	1
1572A Recording and/or reproducing equipment, as follows (For equipment which may be exported in conjunction with computer shipments, see entry No. 1565.):	---[1]	PQSTVWYZ	1,000	EE	1
(a) Using magnetic techniques, *except*:					
(i) Those specifically designed for voice or music;					
(ii) Those specifically designed to use magnetic card, tag, label or bank check recording media with a magnetic surface area not exceeding 10 sq. in. (65 sq. cm.); or					
(iii) Digital recording and reproducing equipment operating serially with a packing density not exceeding 800 bits per inch per track specially designed for use with, and incorporated in, typewriter systems used for preparing, correcting and/or composing text;					
(b) Using electron beam(s) operating in a vacuum, and/or laser-produced light beams (see also entry No. 1522) that produce patterns or images directly on the recording surface, and specialized equipment for image development, *except equipment specifically designed for television recording and/or reproducing on discs;*					
(c) Graphic instruments capable of continuous direct recording of sinusoidal waves at frequencies exceeding 20 kHz; and					
(d) Specialized parts and components for the above and recording media used in equipment covered by subentries (a) and (b). (The term "recording media" is intended to include all types and forms of specialized recording media used in such recording techniques, including but not limited to tapes, drums, discs and matrices.)					
(Specify by name and model number.)					
1576A Now covered by U.S. Department of State, Office of Munitions Control.					
1579A Now covered by entry No. 6599.					
1584A Cathode-ray oscilloscopes, and specialized parts therefor including associated plug-in units, external amplifiers, and pre-amplifiers and sampling devices, having any of the following characteristics:	---[2]	PQSTVWYZ	1,000	EE	1, 4[3]
(a) An amplifier bandwidth greater than 100 MHz (defined as the band of frequencies over which the deflection on the cathode-ray tube does not fall below 70.7 percent of that at maximum point measured with a constant input voltage to the amplifier);					
(b) Containing or designed for use with cathode-ray tubes covered by entry No. 1541(b) or (c);					
(c) Ruggedized to meet a military specification;					
(d) Rated for operation over an ambient temperature range of from below −25°C to above +55°C;					

[1] Report equipment in "number."
[2] Report oscilloscopes in "number."
[3] The countries to which commodities in this entry are controlled for nuclear reasons are those *not* listed in Supp. No. 2 or Supp. No. 3 to Part 373.

Export Control Commodity Number Commodity Description	Unit	Validated License Required	GLV $ Value Limits TAV	Processing Code	Reason for Control
Entry No. 1584 (cont.)					
(e) Using sampling techniques for the analysis of recurring phenomena which increase the effective bandwidth of an oscilloscope or time domain reflectometer to a frequency greater than 1,000 MHz; or					
(f) Digital oscilloscopes with sequential sampling of the input signal at an interval of less than 50 nanoseconds.					
(Specify by name and model number.)					
4584B Now covered by sub-entry Nos. 1541(c) and 1584(a)(2).					
1585A Photographic equipment, as follows:	||-------[1]||	PQSTVWYZ	500[2]	MG	—
(a) High speed cinema recording cameras and equipment, and specially designed parts and accessories therefor, as follows:					1
(1) Cameras in which the film is continuously advanced throughout the recording period, and which are capable of recording at framing rates exceeding 13,150 frames per second, using any camera and film combination from the standard 8 mm to 90 mm size inclusive; and					
(2) Special optical or electronic devices which supplement, replace, or are interchangeable with standard camera components for the purpose of increasing the number of frames per second;					
(b) High speed cameras, and specially designed parts and accessories therefor, in which the film does not move, and which are capable of recording at rates exceeding 1,000,000 frames per second for the full framing height of standard 35mm wide photographic film, or at proportionately higher rates for lesser frame heights, or at proportionately lower rates for greater frame heights;					1, 4
(c) Cameras incorporating electron tubes covered by entry No. 1555(a);					1, 4
(d) Streak cameras having writing speeds of 10 mm/microsecond and above, and specially designed parts and accessories therefor;					1, 4
(e) Camera shutters with speeds of 50 nanoseconds or less per operation, and specialized parts and accessories therefor;					1, 4
(f) Film, as follows:					—
(1) Having an intensity dynamic range of 1,000,000:1 or more; or					1, 4
(2) Having a speed of ASA 10,000 (or its equivalent) or better;					1, 4
(3) Color film having a spectral sensitivity extending beyond 7,200 Angstroms or below 2,000 Angstroms; and					1, 5
(g) High speed plates having an intensity dynamic range of 1,000,000:1 or more.					1,4
4585B Photographic equipment, as follows:	||-------[1]||	PQSTVWYZ	500[3]	MG	—
(a) Streak cameras capable of recording events which are initiated by, or synchronized with the camera mechanism (*i.e.*, discontinuous access type), having a design capability for writing speeds of 8 mm per microsecond and above *and* a time resolution of 100 nanoseconds or less, and parts and accessories, n.e.s.;					1, 4

[1] Report cameras in "number" and film in "sq. ft."
[2] For sub-item (f)(3) of this entry, General License *GLV* applies only to exports to Australia, Belgium, Denmark, France, the Federal Republic of Germany (including West Berlin), Greece, Iceland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal and the United Kingdom.
[3] For sub-item (e) of this entry, General License *GLV* applies only to exports to Australia, Belgium, Denmark, France, the Federal Republic of Germany (including West Berlin), Greece, Iceland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Turkey and the United Kingdom.

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Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control
Entry No. 4585 (cont.)					
(b) Aerial camera film, black and white, sensitized and unexposed, having spectral sensitivities at wavelengths greater than 7,500 Angstroms or at wavelengths less than 2,000 Angstroms;					1
(c) Aerial camera film, sensitized and unexposed, having resolving powers (using a Test-Object Contrast of 1,000:1) of 200 line pairs/mm or more or with a base thickness before coating of 0.0025 inch or less;					1
(d) Continuous tone aerial duplicating film, sensitized and unexposed, having resolving powers (using a Test-Object Contrast of 1,000:1) of 300 line pairs/mm or more; and					1
(e) Instrumentation and/or recording film, sensitized and unexposed, having photo-recording sensitivities (as based on the reciprocal of the tungsten exposure in meter-candle-seconds at an exposure time of 0.0001 second) of 125 or more and resolving power (using a Test-Object Contrast of 1,000:1) of 55 line pairs/mm or more and with a base thickness before coating of 0.004 inch or less and capable of being processed in solutions with alkalinities of pH 10 or above at temperatures greater than 85°F.					1, 5
5585D [1] Photographic equipment, as follows:	[2]	PQSWYZ [1] and Afghanistan	—[3]	MG	—
(a) Other high-speed continuous writing, rotating drum cameras capable of recording at rates in excess of 2,000 frames per second, and parts and accessories, n.e.s.; and					4
(b) Other 16 mm high-speed motion picture cameras capable of recording at rates in excess of 2,000 frames per second, and parts and accessories, n.e.s.					1
1586A Acoustic wave devices and specialized parts therefor, as follows:		PQSTVWYZ	500	EE	1
(a) Surface acoustic wave and surface skimming acoustic wave devices (*i.e.*, signal processing devices employing elastic waves in materials, including but not limited to, lithium niobate, lithium tantalate, bismuth germanium oxide, silicon, quartz, yttrium garnet, aluminum oxide and magnesium aluminum oxide) which permit direct processing of signals, including but not limited to, amplifiers, correlators (fixed, programmable and memory), oscillators, bandpass filters (transversal and resonator), multiplexers, dispersive expansion and compression filters, delay lines (fixed and tapped) and non-linear devices, having any of the following characteristics:					
(1) A carrier frequency of greater than 400 MHz;					
(2) A carrier frequency of 400 HMz or less, *except those specially designed for home electronics and entertainment type appliactions*, having any of the following characteristics:					
(i) A side-lobe rejection of greater than 45 dB;					
(ii) A product of the maximum delay time and the bandwidth (time in microseconds and bandwidth in MHz) greater than 100;					
(iii) A dispersive delay of greater than 10 microseconds;					
(iv) An insertion loss of less than 10 dB;					

[1] A validated license also is required for export to the Republic of South Africa and Namibia if intended for delivery to or for use by or for military or police entities in these destinations or for use in servicing equipment owned, controlled or used by or for these entities. See §§ 371.2(c)(11) and 385.4(a).
[2] Report cameras in "number" and film in "sq. ft."
[3] The GLV $ value limit for Country Group Q is $100.

CCL-64 Group 5 Commodity Control List—399.1

Export Control Commodity Number / Commodity Description	Unit	Validated License Required	GLV $ Value Limits TAV	Processing Code	Reason for Control
Entry No. 1586 (cont.)					
(b) Bulk (volume) acoustic wave devices (*i.e.*, signal processing devices employing elastic waves in the various materials described in sub-entry (a) above) which permit direct processing of signals at frequencies over 1 GHz, including but not limited to, fixed delay lines, non-linear and pulse compression devices.					
(Specify by name and model number.)					
1587A Quartz crystals and assemblies thereof in any stage of fabrication (*i.e.*, worked, semi-finished or mounted), *except optical grade quartz crystals*, as follows:	--------	PQSTVWYZ	500	EE	1
(a) For use as filter elements, and having either of the following characteristics:					
(1) Designed for operation over a temperature range wider than 125°C; or					
(2) Crystals or assemblies of crystals which use the trapped energy phenomenon (*i.e.*, those which have more than one series or parallel resonance on a single quartz element);					
(b) For use as oscillator elements specially designed for temperature-controlled crystal ovens and/or for TCXOs covered by sub-entry (c) below, and having an average aging rate of $\pm 1 \times 10^{-9}$ per day or better (less) (Aging rate shall be measured over a longer period at a constant temperature of +60°C or higher which vary only by ±2°C.);					
(c) Temperature-compensated crystal oscillators (TCXO) having either of the following characteristics:					
(1) A stability with respect to temperature of better than ±0.00015 percent over their operating temperature range; or					
(2) An operating temperature range wider than 120°C.					
(Specify by name, type number, and characteristics.)					
1588A Materials composed of crystals having spinel, hexagonal, orthorhombic or garnet crystal structures; thin film devices; assemblies of the foregoing; and devices containing them, as follows (for equipment which may be exported in conjunction with computer shipments, see entry No. 1565):	No.	PQSTVWYZ	500	—	1
(a) Monocrystals of ferrites and garnets, synthetic only;				MG	
(b) Single aperture forms possessing any of the following characteristics:				EE	
(1) Switching speed of 0.3 microsecond or faster at the minimum field strength required for switching at 104°F (40°C); or					
(2) A maximum dimension less than 30 mils (0.76 mm);				EE	
(c) Multi-aperture forms with fewer than 10 apertures possessing any of the following characteristics:					
(1) Switching speed of 1 microsecond or faster at the minimum field strength required for switching at 104°F (40°C); or					
(2) A maximum dimension less than 100 mils (2.54 mm);					
(d) Multi-aperture forms having 10 or more apertures;				EE	
(e) Thin film (including plated wire and plated rods) memory storage or switching devices;				EE	
(f) Magnetic ferrite materials having square loop characteristics, suitable for operations above 1 GHz and having all of the following characteristics:					

Commodity Control List—399.1 Group 5 CCL-65

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control
Entry No. 1588 (cont.)					
(1) A saturation magnetization of greater than 0.3 tesla (3,000 gauss);					
(2) A dielectric loss tangent of less than 0.001 measured at a frequency of 1 GHz or greater;					
(3) A ratio of the remanent magnetization (B_r) to the saturation magnetization ($4\pi M_s$) equal to or greater than 0.7, and					
(g) Rod forms possessing either of the following characteristics:		EE			
(1) Switching speed of 0.3 microsecond or faster at the minimum field strength required for switching at 104°F (40°C); or					
(2) A minimum dimension less than 10 mils (0.254 mm).					
(Specify by name and characteristics.)					
4589B Now covered by entry No. 1534.					
4590B Multispectral image processing systems or digital image display enhancement equipment which provide or accept signals of sufficient composite information that when connected to an optical display device will have *all* of the following capabilities:	[1]	PQSTVWYZ	100	MG	1, 4
(a) Image construction of at least 60 Raster lines (*i.e.*, 60x60 resolvable elements, 60x60 resolution cells or Pixels, or 60x60 images);					
(b) Each image element is capable of being displayed in at least 16 different shades of color or gray; and					
(c) The system has conversion and synchronization circuitry suitable for driving a TV monitor, storage display, graphic memory, memory refreshment, or other type of optical display devices; and					
(d) Parts, components, and assemblies therefor.					
4592B Equipment for measuring pressures to 100 Torr or less having corrosion-resistant sensing elements of nickel, nickel alloys, phosphor bronze, stainless steel, or aluminum.		PQSTVWYZ	0	MG	1, 4 [2]
1595A Gravity meters (gravimeters), and specialized parts therefor, designed or modified for airborne or marine use.		PQSTVWYZ	500	MG	1
5595D [3] Other gravity meters (gravimeters) and parts and accessories therefor.		PQSWYZ [3] and Afghanistan	—[4]	MG	1
5596D [3] Capacitance strain gages designed for operation at temperatures of +600°F and over; and parts and accessories therefor.		PQSWYZ [3] and Afghanistan	—[4]	MG	1
4597B [5] Voice print identification and analysis equipment; and parts, n.e.s. (See § 376.14.) (Specify by name and type number.)	[1]	PQSTVWYZ [5]	0	EE	5

[1] Report instruments and equipment in "number."
[2] The countries to which commodities in this entry are controlled for nuclear reasons are those *not* listed in Supp. No. 2 or Supp. No. 3 to Part 373.
[3] A validated license also is required for export to the Republic of South Africa and Namibia if intended for delivery to or for use by or for military or police entities in these destinations or for use in servicing equipment owned, controlled, or used by or for these entities. See § 371.2(c)(11) and § 385.4(a).
[4] The GLV $ value limit for Country Group Q is $100.
[5] A validated license is *not* required for export of these commodities to Australia, Belgium, Denmark, France, the Federal Republic of Germany (including West Berlin), Greece, Iceland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Turkey and the United Kingdom.

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control
5597B [1] Polygraphs (except biomedical recorders designed for use in medical facilities for monitoring biological and neurophysical responses); fingerprint equipment and analyzers; fingerprint and identification cameras and equipment; automated fingerprint and identification retrieval systems (whether or not computerized); psychological testing machines; infrared and ultraviolet film and plates and other photo anodized plates, sensitized and unexposed; and specially designed parts and accessories, n.e.s.	-------[2]	PQSTVWYZ [1]	0	EE	5
6598F Geophysical and mineral prospecting instruments; and other instruments and equipment specially designed or modified for the examination or testing of equipment utilized in the exploration for, or production of, petroleum or natural gas; and specially designed parts and accessories therefor. (See § 399.2, Interpretation 30 for illustrative list of commodities included in this entry.)	---------	SZ, Afghanistan and the USSR [3]	—	MG	3
6599G [4, 5] Other electronic and precision instruments, including photographic equipment and film, n.e.s.; and parts and accessories, n.e.s.	---------	SZ [4, 5]	—	EE	3
7599I Exposed and developed microfilm reproducing in whole or in part, the content of printed books, pamphlets, and miscellaneous publications including newspapers and periodicals, children's picture and painting books, music books, sheet music, and calendars; motion picture film and sound track, exposed and developed, and advertising printed matter exclusively related thereto.	---------	None	—	MG	—

GROUP 6—METALS, MINERALS, AND THEIR MANUFACTURES [6]

1601A	Now covered by entry No. 1371.					
4601B	Aircraft landing mats -------	Sq. ft.	PQSTVWYZ	1,000 [7]	MG	1
2603A	Specifically designed components and parts for ammunition, *except cartridge cases, powder bags, bullets, jackets, cores, shells, projectiles, boosters, fuses and components, primers, and other detonating devices and ammunition belting and linking machines.* (Specify by name.)	---------	PQSTVWYZ	0 [8]	MG	1, 3, 5
3604A	Zirconium metal; alloys containing more than 50 percent zirconium by weight; compnnds in which the ratio of hafnium content to zirconium content is less than one part to five hundred parts by weight; manufactures wholly thereof; and waste and scrap; *except zirconium metal and alloy in shipments of 5 kilograms or less; and zirconium in the form of foil or strip having a thickness not exceeding 0.025 mm (0.00095 in.) and specially fabricated and intended for use in photo flash bulbs, in shipments of 200 kilograms or less.*	Lb.	PQSTVWYZ	500	MG	1, 4
3605A	Nickel powder and porous nickel metal, as follows:	Lb.	PQSTVWYZ	100	MG	1, 4
	(a) Powder with a nickel content of 99 percent or more, and a particle size of less than 100 micrometers; and					

[1] A validated license is *not* required for export of these commodities to Australia, Belgium, Denmark, France, the Federal Republic of Germany (including West Berlin), Greece, Iceland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Turkey and the United Kingdom.

[2] Report instruments and equipment in "number."

[3] Including Estonia, Latvia, and Lithuania.

[4] A validated license also is required for export to the Republic of South Africa and Namibia if intended for delivery to or for use by or for military or police entities in these destinations or for use in servicing equipment owned, controlled, or used by or for these entities. See § 371.2(c)(11) and § 385.4(a).

[5] A validated license is also required for export or reexport to the U.S.S.R. if the exporter knows or has reason to know the commodity is for any use directly in preparation for, in conduct of, in support of, or visually identified with the 1980 Summer Olympic Games scheduled to commence in Moscow on July 19, 1980. These commodities are subject to controls under the authority of the foreign policy provisions contained in section 6 of the Export Administration Act of 1979. This commodity control list entry as well as the other entries in this Group are subject to controls on the basis of the above criteria.

[6] See § 370.10 for commodities which require export authorization from other U.S. Government Departments and Agencies.

[7] The GLV $ value limit for Country Group Q is $500.

[8] The GLV $ value limit for the following countries is $500: Australia, Belgium, Denmark, France, the Federal Republic of Germany (including West Berlin), Greece, Iceland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Turkey and the United Kingdom.

Commodity Control List—399.1 Group 6 CCL-67

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control

Entry No. 3605 (cont.)

(b) Porous metal material with a mean pore size of 25 micrometers or less, and a nickel purity content of 99 percent or more, *except single porous nickel metal sheets not exceeding 930 m² (144 square inches) in size, intended for use in batteries for civil applications.* (Sub-entry (b) above refers to porous nickel metal manufactured from nickel powder defined in sub-entry (a) above which has been compacted and sintered to form a metal material with fine pores interconnected throughout the structure.)

3607A Lithium, as follows:	Lb.	PQSTVWYZ	100	MG		1, 4

(a) Metal;

(b) Hydrides, in which lithium, whether normal, depleted, or enriched in the 6 isotope is compounded with hydrogen or its isotopes; or

(c) Alloys containing 50 percent or more of lithium either normal or depleted in the 6 isotope, or containing any quantity of lithium enriched in the 6 isotope; and

(d) Any other material containing lithium enriched in the 6 isotope, including compounds, mixtures, and concentrates; *except shipments of any of the following, provided that none contains lithium enriched in the 6 isotope:*

(1) 1 kilogram or less of metal or of metal contained in an alloy;

(2) 10 kilograms or less of hydrides;

(3) 50 kilograms or less of lithium deuteride; and except shipments of lithium enriched in the 6 isotope incorporated in thermoluminescent dosimeters.

4607B Lithium, as follows:		PQSTVWYZ	100	MG		4

(a) Alloys containing any quantity of lithium enriched in the 7 isotope;

(b) Any other material containing lithium enriched in the 7 isotope, including compounds, mixtures, and concentrates in quantities greater than 10 kg, *except lithium enriched in the 7 isotope incorporated in thermoluminescent dosimeters.*

Previous 3608A now covered by entry No. 3604.

3608A Hafnium as follows: metal, and alloys and compounds of hafnium containing more than 60 percent hafnium by weight, and manufactures thereof, *except shipments of the above having a hafnium content of 1 kilogram or less.*	Lb.	PQSTVWYZ	250	MG		1, 4
3609A Beryllium, as follows: metal, alloys containing more than 50 percent of beryllium by weight, compounds containing beryllium, manufactures thereof, and waste and scrap, *except metal windows for X-ray machines; oxide shapes in fabricated or semi-fabricated forms specially designed for electronic component parts or as substrates for electronic circuits; shipments of 500 grams or less of beryllium having a purity of 99 percent or less, or 100 grams or less of beryllium having a purity of greater than 99 percent, provided shipments exclude single crystals; and shipments of 5 kilograms or less of beryllium contained in compounds with a purity of less than 99 percent.*	Lb.	PQSTVWYZ	500	MG		1, 4

3611A Now covered by entry No. 3605.

3612A Now covered by entry No. 3609.

2616A Gilding metal clad steel, munitions materials.	Lb.	PQSTVWYZ	500	MG		1

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control
1631A Magnetic metals of all types and of whatever form, possessing one or more of the following characteristics:	Lb.	PQSTVWYZ	500	MG	1
(a) Grain oriented sheet or strip of a thickness of 0.004 inch (0.1 mm) or less;					
(b) Initial permeability: 120,000 gauss-oersteds (0.15 Henry/m) or over calculated at 0.0 μ permeability or the equivalent;					
(c) Remanence 98.5 percent or over of maximum flux for materials having magnetic permeability; and					
(d) A composition capable of an energy product:					
(1) Exceeding 10 times 10^6 gauss-oersteds (80,000 joules/cu.m.); or					
(2) 4.85 times 10^6 gauss-oersteds (38,600 joules/cu.m.) or greater and having a coercive force of 1,800 oersteds (143,200 amperes/m) or greater.					
1635A Iron and steels, alloyed, containing 10 percent or more molybdenum (but more than 5 percent molybdenum in any alloys containing more than 14 percent chromium), *except products obtained by casting and having a carbon content of more than 1.5 percent.*	Lb.	PQSTVWYZ	1,000	MG	1
3635A Now covered by entry No. 3607.					
4635B Pressure tube, pipe, and fittings therefor, of 8 inches or more inside diameter, having a wall thickness of 8 percent or more of the inside diameter and made of:	Lb.	PQSTVWYZ	500	MG	1, 4
(a) Stainless steel,					
(b) Copper-nickel alloy, or					
(c) Other alloy steel containing 10 percent or more nickel and/or chromium.					
3637A Now covered by entry No. 3608.					
3638A Now covered by entry No. 6699.					
1648A Cobalt based alloys (*i.e.*, containing a higher percentage by weight of cobalt than of any other element) as follows:	Lb.	PQSTVWYZ	500	MG	1
(a) Containing 5 percent or more of tantalum;					
(b) Dispersion strengthened containing more than 1 percent of oxides of thorium, aluminum, yttrium, zirconium or cerium; or					
(c) Containing 0.05 percent or more of scandium, yttrium, didymium, cerium, lanthanum, neodymium, or praseodymium.					
1649A Niobium (columbium), as follows:	Lb.	PQSTVWYZ	500	MG	1
(a) Niobium-based alloys containing 60 percent or more niobium or niobium-tantalum in combination; and					
(b) Scrap forms of the alloys covered by sub-entry (a) above.					

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Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control
1651A Now covered by entry No. 6699.					
1658A Molybdenum alloys containing 97.5 percent or more molybdenum, *except wire.*	Lb.	PQSTVWYZ	500	MG	1
1661A Nickel based alloys (*i.e.*, containing a higher percentage by weight of nickel than of any other element), as follows:	Lb.	PQSTVWYZ	500	MG	1
(a) With a combined content of aluminum and titanium greater than 11 percent;					
(b) Dispersion strengthened containing more than 1 percent of oxides of thorium, aluminum, yttrium, zirconium, cerium, or lanthanum; or					
(c) Containing 0.05 percent or more of scandium, yttrium, didymium, cerium, lanthanum, neodymium, or praseodymium.					
1670A Tantalum and tantalum alloys, as follows:	Lb.	PQSTVWYZ	500	MG	1
(a) Tantalum powder containing less than 200 p.p.m. of total metallic impurities, and sintered anodes made therefrom; and					
(b) Tantalum-based alloys containing 60 percent or more of tantalum, and scrap forms thereof.					
1671A Titanium-based alloys in crude and semi-fabricated form, or as scrap, having the following nominal compositions:	Lb.	PQSTVWYZ	500	MG	1
(a) 6 percent aluminum, 2 percent tin, 4 percent zirconium, 6 percent molybdenum and the balance titanium;					
(b) Other compositions containing 12 percent or more aluminum by weight.					
1673A Artificial graphite having an apparent relative density of 1.90 or greater when compared with water at 60°F (15.50°C), *except artificial graphite which has been impregnated or composited with inorganic materials for the purpose of improving only its electrical conductivity, its mechanical resistance or its mechanical friction properties; and electrical resistors, artificial loads for microwave applications, cable waveguide terminations, brush stock, special joints for electrodes, boats and crucibles and high density graphite optical elements.*	Lb.	PQSTVWYZ	500	MG	1
1674B Specialized packings made of phosphor bronze mesh designed for use in vacuum distillation towers, suitable for use in separating heavy from light water.	----------	PQSTVWYZ	500	MG	4
4673B Cylindrical tubing, raw, semifabricated, or finished forms, made of aluminum alloy (7000 series) or maraging steel or high-strength titanium alloys (*e.g.*, Ti-6 Al-4 V, etc.) having the following characteristics:	----------	PQSTVWYZ and Canada	0	MG	4
(a) Wall thickness of ½ inch, or less;					
(b) Diameter of 3 inches or more.					

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control
4676B Cylindrical rings, or single convolution bellows, made of high-strength steels having all of the following characteristics: (a) Tensile strength of greater than or equal to 150,000 psi; (b) Wall thickness of 3 millimeters or less; (c) Diameter of 3 inches or more.		PQSTVWYZ and Canada	0	MG	4
4677B Cylindrical discs, in raw, semifabricated, or finished form, having all of the following characteristics: (a) Having a ½ to 2 inch peripheral lip; (b) Having a diameter of 3 inches or more; (c) Made of maraging steel or aluminum alloy (7000 series).		PQSTVWYZ and Canada	0	MG	4
4678B Corrosion-resistant sensing elements of nickel, nickel alloys, phosphor bronze, stainless steel, or aluminum specially designed for use with equipment which measures pressures to 100 Torr or less.		PQSTVWYZ	0	MG	4
5680B [2] Nonmilitary protective vests, helmets, leg irons, shackles, handcuffs, thumbcuffs, thumbscrews, and saps.		PQSTVWYZ [3]	0	MG	5
6699G [4,5,6] Other metals, minerals, and their manufactures, n.e.s.		SZ [4,5,6]	—	MG	3

GROUP 7—CHEMICALS, METALLOIDS, PETROLEUM PRODUCTS AND RELATED MATERIALS [6]

1701A Lead azide and primary explosives or priming compositions (mixtures) containing azides and/or azide compounds or complexes (for example, orthofluorophenyl azide, silver chlorazide, cuprammonium azide).	Lb.	PQSTVWYZ	500	MG	1
1702A Hydraulic fluids which are or which contain as the principal ingredients petroleum (mineral) oils or synthetic hydrocarbon oils and which have all of the following characteristics: (a) A pour point of −30°F (−34°C) or lower; (b) A viscosity index of 75 or greater; and (c) Are thermally stable at +650°F (+343°C). (See § 377.6(d)(6) and § 377.6(e)(2) for special documentation requirements. Also see § 371.5(d) for special provisions regarding shipments under General License *GLV*.)	Bbl.	PQSTVWYZ	500	MG	1

[1] The countries to which commodities are controlled for nuclear reasons are those *not* listed in Supp. No. 2 or Supp. No. 3 to Part 373.

[2] A validated license *is not* required for export of these commodities to Australia, Belgium, Denmark, France, the Federal Republic of Germany (including West Berlin), Greece, Iceland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Turkey and the United Kingdom.

[3] A validated license also is required for export to the Republic of South Africa and Namibia if intended for delivery to or for use by or for military or police entities in these destinations or for use in servicing equipment owned, controlled, or used by or for these entities. See § 371.2(c)(11) and § 385.4(a).

[4] A validated license is also required for export or reexport to the U.S.S.R. if the exporter knows or has reason to know the commodity is for any use directly in preparation for, in conduct of, in support of, or visually identified with the 1980 Summer Olympic Games scheduled to commence in Moscow on July 19, 1980. These commodities are subject to controls under the authority of the foreign policy provisions contained in section 6 of the Export Administration Act of 1979. This commodity control list entry as well as the other entries in this Group are subject to controls on the basis of the above criteria.

[5] Aluminum powder, or aluminum-magnesium alloy powder, atomized or spherical, with an average particle diameter of 100 microns or less with a purity of 97.0 percent or greater, and aluminum alloy plates, sheets, and other wrought forms of Temper H alloy and all 5083 alloys, *except "O" temper form*, require export authorization from the U.S. Department of State, Office of Munitions Control. See Supplement No. 2 to Part 370.

[6] See § 370.10 for commodities which require export authorization frrom other U.S. Government Departments or Agencies.

Commodity Control List—399.1 Group 7 CCL-71

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits FAV	Processing Code	Reason for Control
4707B (a) Chemicals, as follows:	Lb.	PQSTVWYZ	500[1]	MG	1
(1) Beta-diethylaminoethyl diphenylpropylacetate hydrochloride, (2) 2-Chloro-10-(3-dimethylaminopropyl) phenothiazine, (3) 2-Chlorophenothiazine, (4) 2-Cyanoacetamide, (5) 2-Dicyclohexylcarbodiimide, (6) Diethylmethylphosphonite, (7) Dihydrodibenzazepine, (8) Dihydrodibenzocycloheptene, (9) 10, 11-Dihydro-N, N-dimethyl-5H-dibenzo (a, d) cycloheptent delta 5, gamma-propylamine, (10) 2-Diisopropylaminoethanol, (11) Diisopropylcarbodiimide, (12) 5-(3-(Dimethylamino)-2-methylpropyl)-10, 11-dihydro-5H-dibenz (b,f) azepine, (13) Dimethylamino propylchloride hydrochloride, (14) 5-(3-Dimethylaminopropyl)-10, 11-dihydro-5H-dibenz (b,f) azepine, (15) 10-(3-Dimethylaminopropyl)-2-trifluorodimethylphenothiazine, (16) Dimethyl hydrogen phosphite, (17) Di-o-tolyl carbodiimide, (18) Dissopropylaminoethylchloride hydrochloride, (19) Ethylphosphonothioic dichloride, (20) Ethylphosphonous dichloride, (21) Lysergic acid diethylamine, (22) Malononitrile, (23) Methylbenzylate, (24) Methyldichlorphosphine, (25) Methylisonicotenate, (26) Methylphosphonothioic dichloride, (27) Methylphosphonous dichloride, (28) Methylphosphonyldichloride, (29) N, N-diethylethylenediamine (diethylaminoethylamine), (30) Orthochlorobenzaldehyde, (31) Phenothiazine, (32) Piperidine carboxyl acid, (33) n-Propylphosphonous dichloride, (34) 3-Quinuclidinol, (35) 3-Quinuclidinone, (36) 2-Trifluoromethylphenothiazine, and (37) 4-(3-(2-Trifluoromethyl) phenothiazine-10-yl) propyl)-1-piperazine ethanol.					
(b) Synthetic organic agricultural chemicals, as follows: (1) Alkyl aryl carbamates (including isopropyl N-phenylcarbamate and isopropyl N-(3-chlorophenyl)-carbamate), (2) Aminochloropicolinic acid and its salts and esters, (3) Bromoalkyl pyrimidines, (4) Cacodylic acid, (5) Chlorophenoxyacetic and chlorofluorophenoxyacetic acids and their salts and esters, and (6) Herbicidal or antiplant preparations containing one or more of the above in amounts totaling, alone or in combination with another, 80 percent or more by weight.					
2708A Explosives, propellants, and fuels, as follows: (a) Ethyl and Methyl centralites, (b) NN-Diphenylurea (unsymmetrical diphenylurea), (c) Methyl-NN-diphenylurea (methyl unsymmetrical diphenylurea), (d) Ethyl-NN-diphenylurea (ethyl unsymmetrical diphenylurea), (e) Ethyl phenyl urethane, (f) Diphenyl urethane, (g) Diortho tolyl-urethane, (h) 2-Nitrodiphenylamine, (i) p-Nitromethylaniline, (j) 2,2' Dinitropropanol, (k) Bis (2,2' dinitropropyl) formal and acetal, (l) 3—Nitraza—1,5 pentane diisocyanate, (m) Guanidine nitrate, and (n) Hydrogen peroxide in concentrations of 85%.	Lb.	PQSTVWYZ	500	MG	1

[1] The GLV $ value limit for Country Group Q is $100, except for sub-entry (b), which is $500.

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limit TLV	Processing Code	Reason for Control
3709A Beryllium oxide ceramic and refactory tubes, pipes, crucibles, and other shapes in semi-fabricated or fabricated form, *except forms specially designed for electronic component parts or as substrates for electronic circuits.*	Lb.	PQSTVWYZ	500 [1]	MG	1, 4 [2]
3711A Chlorine trifluoride, *except shipments of 5 kilograms or less.*	Lb.	PQSTVWYZ	50	MG	1, 4
4712B Now covered by entry No. 3709.					
1715A Boron, as follows:	Lb.	PQSTVWYZ	500	MG	1, 4 [3]
(a) Boron element, boron compounds and mixtures in which the boron–10 isotope comprises more than 20 percent of the total boron content;					
(b) Boron element (metal) all forms; and					
(c) Boron compounds, mixtures and composites containing 5 percent or more of boron, *except pharmaceutical specialties packaged for retail sale,* as follows:					
(1) Boron carbide, *except powder,* having a boron content of 70 percent or more by weight and composites thereof in crude or semi-fabricated forms;					
(2) Boron nitride (hexagonal close-packed structure, white form) and composites thereof in crude or semi-fabricated forms; other boron-nitrogen compounds (*e.g.*, borazanes, borazines, and boropyrazoyls);					
(3) Boron hydrides (*e.g.*, boranes), *except sodium boron hydride, potassium boron hydride, monoborane, diborane and triborane;*					
(4) Organoboron compounds; including metalloorganoboron compounds; and					
(5) Borides with purities above 98.5 percent and having melting points of 3,632°F (2,000°C) or higher and composites thereof in crude or semi-fabricated forms.					
3715A Now covered by entry No. 3711.					
4720B Radioisotopes, cyclotron-produced or naturally occurring, *except those having an atomic number 3 through 83,* and compounds and preparations thereof. (Specify by name and isotope number.)	MC	PQSTVWYZ	100 [1]	MG	4
4721B Helium isotopically enriched in the helium–3 isotope, in any form or quantity, and whether or not admixed with other materials, or contained in any equipment or device.	Liters	PQSTVWYZ and Canada	1,000	MG	1
1746A Polymeric substances and manufactures thereof, where the value of the polymeric component, either alone or in combination with other materials included on the Commodity Control List under an Export Control Commodity Number that is followed by the code letter "A", is 50 percent or more of the total value of the materials, as follows:	Lb.	PQSTVWYZ	100 [4]	MG	1

[1] The GLV $ value limit for Country Group Q is $100.
[2] The countries to which commodities are controlled for nuclear reasons are those *not* listed in Supp. No. 2 or Supp. No. 8 to Part 378.
[3] Nuclear controls apply to all of this entry except sub-entries (c)(2)(3), (4) and (5).
[4] For protective vests and devices manufactured of aromatic polyamides described in sub-entry (d), General License *GLV* applies only to exports to Australia, Belgium, Denmark, France, the Federal Republic of Germany (including West Berlin), Greece, Iceland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Turkey and the United Kingdom.

Commodity Control List—399.1 Group 7 CCL-73

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control

Entry No. 1746 (cont.)

(a) Polyimides, *except fully cured polyimide or polyimide-based film, sheet, tape or ribbon having a maximum thickness of 10 mils (0.010 inch or 0.254 mm) whether or not coated or laminated with heat- or pressure-sensitive resinous substances of an adhesive nature, which contain no fibrous reinforcing materials, and which have not been coated or laminated with carbon, graphite, metals or magnetic substances;*

(b) Polybenzimidazoles;

(c) Polyimidazopyrrolones;

(d)[1] Aromatic polyamides, *except staples, fibers, filaments, yarns and threads having a fiber modulus of 250 grams-force per denier or less and a tenacity of 11 grams-force per denier or less, and textile or mat products thereof;*

(e) Polyparaxylylenes;

(f) Polyphenylene sulphides;

(g) Polyquinoxalines;

(h) Polybenzothiazoles;

(i) Polyoxadiazoles;

(j) Polytriazoles;

(k) Polythiazoles;

(l) Polyphosphonitriles;

(m) Polybenzimidazolphenanthrolines;

(n) Polypyrazines;

(o) Polyspiranes;

(p) Polysilazanes;

(q) Polyperfluorotriazines;

(r) Polysilsequioxane ladders;

(s) Polyparabenzoquinone ladders; and

(t) Polynaphthaleneimidazoanthraquinone ladders.

4746B Polymeric substances, thermally stable, having weight loss of 15 percent or less after exposure for 24 hours to a temperature of 400° C (752° F) in air, and manufactures thereof, where the value of the polymeric component, either alone or in combination with other materials included on the Commodity Control List under an Export Control Commodity Number that is followed by the code letter "A," is 50 percent or more of the total value of the materials. || Lb. || PQSTVWYZ || 100 || MG || 1

Examples of thermally stable polymeric substances include, but are not limited to, the following:

Polyarlyenesulfones
Polyphenlyene oxides, excluding styrene modified forms
Polymetallocenes
Fluoroepoxides
Polyimidazoimides
Polyparaoxybenzoyls
Polyphenylenes
Polybenzimidazolones
Polytetraazopyrenes
Polybenzoxazinones
Polytriptycenes
Coordination polymers
Polyaroylanthranilamides
Polyanthazolines
Polycarboxylimides
Polyarylethers
Polycarboranesiloxanes
Polyboroimidazolines
Polyiminoimidazolidinediones
Polyparbanic acids
Polyaryloxysilanes
Polymetallosiloxanes
Polyquinazolinediones
Polyquinazolones

1754A Fluorocarbon compounds and manufactures, as follows: || Lb.[2] || PQSTVWYZ || 1,000 || MG || 1

(a) Monomeric and polymeric materials, as follows:

(1) Polychlorotrifluoroethylene, oily and waxy modifications only;

(2) Copolymers and terpolymers composed of any combination of the following monomers: tetrafluoroethylene, chlorotrifluoroethylene, vinylidene fluoride, hexafluoropropylene, and bromotrifluoroethylene, *except the copolymers of tetrafluoroethylene and hexafluoropropylene;*

(3) Polybromotrifluoroethylene;

[1] Bullet and blast resistant garments and devices included in this sub-entry are controlled for crime control reasons.
[2] Report wire and cable in "feet."

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control
Entry No. 1754 (cont.)					
(4) Dibromotetrafluoroethane, *except that having a purity of 99.8 percent or less and containing at least 25 particles of 200 microns or larger in size per 100 ml;* or					
(5) Perfluoroalkylamines;					
(b) Greases, lubricants and dielectric, damping and flotation fluids made wholly of any of the materials in sub-entry (a) above; and					
(c) Electric wire and cable coated with or insulated with any of the materials in sub-entry (a)(2) above, *except oil well logging cable.*					
4754B Synthetic resins, as follows:	Lb.	PQSTVWYZ	500[1]	MG	1
(a) Irradiated polyolefin film, sheeting, and laminates;					
(b) Methyl methacrylate, cross-linked, hot stretched, clear, film, sheeting, or laminates;					
(c) Other fluorocarbon polymers and copolymers, *except the coplymer of tetrafluoroethylene and perfluoroalkyl vinyl ether; polyvinyl-fluoride, solid forms of polychlorotrifluoroethylene, and non-dispersion grades of polytetrafluoroethylene, and products wholly made thereof;* and					
(d) Other fluorocarbon polymer and copolymer products, *except ethylene/tetrafluoroethylene copolymers,* as follows:					
(1) Products wholly made thereof;					
(2) Molding compositions containing more than 20 percent by weight of fluorocarbon polymers or copolymers; or					
(3) Laminates partially made of fluorocarbon polymers or copolymers, including molded, decorative, or laminated with other materials or metals.					
(Specify by name.)					
1755A Silicone fluids and greases, as follows:	Bbl.	PQSTVWYZ	500	MG	1
(a) Fluorinated silicone fluids; and					
(b) Silicone lubricating grease capable of operating at temperatures of 365°F (180°C) or higher and having a drop point (method of test being ASTM or ITP) of 428°F (220°C) or higher.					
4755B Silicone fluids and resins, as follows:	Lb.	PQSTVWYZ	500[2]	MG	1
(a) Silicone diffusion pump fluids having the capacity for producing ultimate pressures of less than 10^{-8} Torr; and					
(b) Thermally stable silicone resins capable of withstanding temperatures of 752°F (400°C) and greater with weight losses of 15 percent or less over a 24 hour test.					
1757A Other compounds and metallic materials, as follows:	No.	PQSTVWYZ	500	MG	1
(a) Monocrystalline silicon wafers, including epitaxially-layered types, having the following characteristics:					
(1) Dislocation densities of 750 sq. cm. or less; and					
(2) Resistivity of less than 70 ohm x cm for N-type; less than 100 ohm x cm for P-type;					

[1] The GLV $ value limit for Country Group Q is $500.
[2] The GLV $ value limit for Country Group Q is $100.

Commodity Control List—399.1 Group 7 CCL-75

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control
Entry No. 1757 (cont.)					
(b) Monocrystalline gallium compounds, *except gallium phosphide, and except gallium arsenide, gallium arsenide phosphide, and gallium nitride having all of the following characteristics:*					
(1) Diffusion processed wafers;					
(2) Selenium, tellurium, silicon, sulphur, tin or zinc doped;					
(3) Dislocation density (EPD) greater than 10,000 per sq. cm.;					
(4) Carrier concentration greater than 1 x 10^{16} per cu. cm.; and					
(5) Carrier mobility less than 2,000 sq. cm. per volt second;					
(c) Monocrystalline indium compounds in any form, *except electronic grades of monocrystalline materials containing less than 1 percent of indium;*					
(d) Composites (hetero-epitaxial materials) consisting of a monocrystalline insulating substrate epitaxially layered with silicon, compounds of gallium or compounds of indium; and					
(e) Mercury cadmium telluride compounds in any form.					
1757B Other compounds and metallic materials, as follows:	----------	PQSTVWYZ	100 [1]	MG	1
(a) Single crystal sapphire substrates;					
(b) Monocrystalline silicon in the form of wafers (slices) or ingots (boules) have a resistivity of 50 ohm-cm or less;					
(c) Electronic grade polysilicon.					
(Specify by size and weight.)					
1759A Syntactic foam for underwater use formulated for applications at depths greater than 1,000 meters (3,281 feet) or with a density (specific gravity) of 0.561 g/cm^3 (35 lbs/cu. ft.) or less. (Syntactic foam consists of hollow plastic or glass spheres less than 100 micrometers in diameter uniformly embedded in a resin matrix.) For deep submergence vehicles, see entry No. 1418.	----------	PQSTVWYZ	0	MG	1
1760A Compounds of tantalum and niobium (columbium), as follows:	Lb.	PQSTVWYZ	500	MG	1
(a) Tantalates and niobates having a purity of 98 percent or more; and					
(b) Other compounds containing 20 percent or more of tantalum in which the niobium content with respect to tantalum is less than one part per thousand.					
1763A Fibrous and filamentary materials which may be used in composite structures or laminates and manufactures thereof, as follows:	Lb.	PQSTVWYZ	250	MG	1, 4
(a) Having both of the following characteristics:					
(1) Specific modulus greater than 1.25 x 10^8, and					
(2) Specific tensile strength greater than 3 x 10^6;					
(b) Having both of the following characteristics:					

[1] The GLV $ value limit for Country Group Q is $100.

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control
Entry No. 1763 (cont.)					
(1) Specific modulus greater than 1 x 10^7, and					
(2) Melting or sublimation point higher than 3,000°F (1,649°C) in an inert environment; *except carbon fibers having a specific modulus of less than 2 x 10^8 and a specific tensile strength of less than 1 x 10^6;* and					
(c) Composite structures and laminates, including metal matrix composite materials, fabricated by using equipment controlled by entry No. 1357, or by metal casting, or by strengthening eutectic alloys *in situ* by directional solidification, from materials described in sub-entries (a) and (b) above.					
("Fibrous and filamentary materials" includes:					
(a) Continuous monofilaments,					
(b) Continuous yarns and rovings,					
(c) Tapes, woven fabrics and random mats,					
(d) Chopped fibers, staple fibers and coherent fiber blanket, and					
(e) Whiskers, either monocrystalline or polycrystalline, of any length.)					
("Specific modulus" is Young's modulus in lbs/sq. in. (measured at a temperature of 73.4°F ± 3.6°F (23°C ± 2°C) and a relative humidity of 50 percent ± 5 percent) divided by density in lbs/cu. in. "Specific tensile strength" is ultimate tensile strength in lbs/sq. in. (measured at a temperature of 73.4°F ± 3.6°F (23°C ± 2°C) and relative humidity of 50 percent ± 5 percent) divided by density in lbs/cu. in.)					
1767A Preforms of glass or of any other material specially designed for the fabrication of optical transmission fibers intended for the manufacture of cable covered by entry No. 1526 II(c). (Optical fiber preforms are defined as bars, ingots, or rods of glass, plastic or other materials which have been specially processed for use in fabricating optical fibers. The characteristics of the preform determine the basic parameters of the resultant drawn optical fibers.)	----------	PQSTVWYZ	500	MG	1
4778B Inorganic chemicals, as follows: ammonia, anhydrous or in aqueous solution; carbon dioxide; carbon monoxide; helium and mixtures thereof; and hydrogen; listed in Supplement No. 2 to Part 377. (See §§ 371.16 and 371.5(d) for special provisions regarding shipments under General Licenses *G-NNR* and *GLV*.)	----------	PQSTVWYZ and Canada	0	SS	2
5779B Now covered by entry No. 4799.					
6779F[3] Drilling fluids, muds, lost circulation materials and polymers and other detergents utilized for enhanced recovery of petroleum or natural gas.	----------	SZ, Afghanistan and the USSR[2, 3]	—	MG	3
1781A Synthetic lubricating oils and greases which are or which contain, as their principal ingredient, the following:	Bbl.	PQSTVWYZ	500	MG	1
(a) Monomeric and polymeric forms of perfluorotriazines, perfluoroaromatic ethers and esters, and perfluoroaliphatic ethers and esters; or					
(b) Polyphenyl ethers and/or thio ethers containing more than three phenyl and/or alkyl phenyl groups.					

[1] Report unit of quantity for each commodity as specified in Supplement No. 2 to Part 377.
[2] A validated license is also required for export to the Republic of South Africa and Namibia if intended for delivery to or for use by or for military or police entities in these destinations or for use in servicing equipment owned, controlled, or used by or for these entities. See §§ 371.2(c)(11) and 385.4(a).
[3] Including Estonia, Latvia, and Lithuania.

Commodity Control List—399.1 Groups 7—8 ECL-77

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control
4781B Petroleum, crude or partly refined, including tar sands, shale oil and topped crudes, listed in Supplement No. 2 to Part 377.	Bbl.	PQSTVWYZ and Canada	0 [1]	SS	2
4782B Other petroleum products listed in Supplement No. 2 to Part 377. (See §§ 371.16 and 371.5(d) for special provisions regarding shipments under General Licenses *G-NNR* and *GLV*.)		PQSTVWYZ and Canada	250 [1, 3]	SS	2
4783B Natural gas liquids and other natural gas derivatives listed in Supplement No. 2 to Part 377. (See §§ 371.16 and 371.5(d) for special provisions regarding shipments under General Licenses *G-NNR* and *GLV*.)[4]	Bbl.	PQSTVWYZ and Canada	250 [2]	SS	2
4784B Manufactured gas and synthetic natural gas (except when commingled with natural gas and thus subject to export authorization from the Department of Energy) listed in Supplement No. 2 to Part 377. (See §§ 371.16 and 371.5(d) for special provisions regarding shipments under General Licenses *G-NNR* and *GLV*.)	MCF	PQSTVWYZ and Canada	250 [2]	SS	2
6794F [5] Phosphate rock; phosphoric acid of all concentrations; and processed phosphatic fertilizers of all concentrations (as listed in § 399.2, Interpretation 27).[4]	------ [6]	SZ, Afghanistan and the USSR [5]	—	SS	3
1799B [7, 8] Chemical agents, including tear gas formulations containing 1 percent or less of orthochlorobenzylmalononitrile (CS), and smoke bombs; and fingerprint powders, dyes, and inks. (Specify by name.) (See § 376.14.)	-------	PQSTVWYZ [7, 8]	0	MC	5
5799D [10] Other chemicals, chemical materials and products, plastic materials, regenerated cellulose, artificial resins, and miscellaneous related materials and products, n.e.s., *except those listed in § 399.2, Interpretation 24.*	--------	PQSWYZ [10] and Afghanistan	— [11]	MC	1
6799C [10, 12] Chemicals, chemical materials and products, plastic materials, regenerated cellulose, artificial resins, and miscellaneous related materials and products, n.e.s., listed in § 399.2, Interpretation 24.	--------	SZ [10, 12]	—	MC	3

GROUP 8—RUBBER AND RUBBER PRODUCTS [13]

1801A Synthetic rubber, as follows:	Lb.	PQSTVWYZ	500	MC	1

[1] The GLV $ value limit for exports to Canada is the same as the value limit for Country Groups T and V.
[2] The GLV $ value limit for exports to Canada and to Country Group Q is $250.
[3] The GLV dollar value limit for petroleum asphalt and paving mixtures is $5,000.
[4] Natural gas, and liquified natural gas (L.N.G.) and synthetic natural gas commingled with natural gas require export authorization from the U.S. Department of Energy. See § 370.10(g).
[5] Including Estonia, Latvia, and Lithuania.
[6] Report unit of quantity for each commodity as specified in Statistical Classification of Domestic and Foreign Commodities Exported from the United States, Schedule B.
[7] These commodities are subject to control under the authority of the foreign policy provisions contained in section 6 of the Export Administration Act of 1979.
[8] A validated license is *not* required for export of these commodities to Australia, Belgium, Denmark, France, the Federal Republic of Germany (including West Berlin), Greece, Iceland, Italy, Japan, Luxembourg, The Netherlands, New Zealand, Norway, Portugal, Turkey, and the United Kingdom.
[9] All other forms of tear gas are controlled by the U.S. Department of State, Office of Munitions Control.
[10] A validated license also is required for export to the Republic of South Africa and Namibia if intended for delivery to or for use by or for military or police entities in these destinations or for use in servicing equipment owned, controlled, or used by or for these entities. See § 371.2(c)(11) and §385.4(a).
[11] The GLV $ value limit for Country Group Q is $100.
[12] A validated license is also required for export or reexport to the U.S.S.R. if the exporter knows or has reason to know the commodity, except medicine and medical supplies, is for any use directly in preparation for, in conduct of, in support of, or visually identified with the 1980 Summer Olympic Games scheduled to commence in Moscow on July 19, 1980. These commodities are subject to controls under the authority of the foreign policy provisions contained in section 6 of the Export Administration Act of 1979. This commodity control list entry as well as the other entries in this Group are subject to controls on the basis of the above criteria.
[13] See § 370.10 for commodities which require export authorization from other U.S. Government Departments and Agencies.

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control

Entry No. 1801 (cont.)

(a) Alkyl polysulphide liquid polymers, including polymers which are in themselves liquid, having a molecular weight of 1,200 or less and a viscosity of 2,000 centipoises or less, *except water dispersions, otherwise called latices;*

(b) Fluorinated silicone rubber and other fluorinated elastomeric material and such organic intermediates for their production as contain 10 percent or more of combined fluorine;

(c) Polymeric products of butadiene, as follows:

(1) Carboxyl terminated polybutadiene, hydroxyl terminated polybutadiene, thiol terminated polybutadiene, and cyclized 1,2-polybutadiene;

(2) Moldable copolymers of butadiene and acrylic acid; and

(3) Moldable terpolymers of butadiene, acrylonitrile and acrylic acid or any of the homologues of acrylic acid; and

(d) Carboxyl terminated polyisoprene and polyisobutylene.

6899G [1, 2]	Other rubber and rubber products, n.e.s.	--------	SZ [1, 2]	—	MG	3

GROUP 9—MISCELLANEOUS [3]

1920A	Now covered by entry No. 6999.					
4994F [1]	Agricultural commodities, including animal and vegetable products, as listed in Supplements No. 2 and No. 3 to Part 376.	-------- [5]	SZ, Afghanistan and the USSR [4]	—	SS	1, 3
5994G [1]	Medicines, medical products and supplies.	--------	SZ [1]	—	MG	3
4996B	Western red cedar (Thuja plicata) logs and timber, and rough, dressed, and worked lumber containing wane listed in Supplement No. 4 to Part 377.	MBF	PQSTVWYZ and Canada	0	SS	1
4997B	Viruses or viroids for human, veterinary, plant, or laboratory use, *except hog cholera and attenuated or inactivated systems.*	--------	PQSTVWYZ	0	MG	1
4998B	Bacteria, fungi, and protozoa; *except those listed in § 399.2, Interpretation 28.* (Specify by name.)	--------	PQSTVWYZ	0	MG	1
5998B [6]	Nonmilitary shotguns, barrel length 18 inches or over; and nonmilitary arms, discharge type (for example, stun-guns, shock batons, immobilization guns and projectiles, etc.), *except arms designed solely for signal, flare, or saluting use;* and parts, n.e.s.	--------	PQSTVWYZ [6]	0	MG	3, 5

[1] A validated license also is required for export to the Republic of South Africa and Namibia if intended for delivery or for use by or for military or police entities in these destinations or for use in servicing equipment owned, controlled, or used by or for these entities. See § 371.2(c)(11) and § 385.4(a).

[2] A validated license is also required for export or reexport to the U.S.S.R. if the exporter knows or has reason to know the commodity is for any use directly in preparation for, in conduct of, in support of, or visually identified with the 1980 Summer Olympic Games scheduled to commence in Moscow on July 19, 1980. These commodities are subject to controls under the authority of the foreign policy provisions contained in section 6 of the Export Administration Act of 1979. This commodity control list entry as well as the other entries in this Group are subject to controls on the basis of the above criteria.

[3] See § 370.10 for commodities which require export authorization from other U.S. Government Departments and Agencies.

[4] Including Estonia, Latvia and Lithuania.

[5] Report unit of quantity for each commodity as specified in Statistical Classification of Domestic and Foreign Commodities Exported from the United States, Schedule B.

[6] A validated license *is not* required for export of these commodities to Australia, Belgium, Denmark, France, the Federal Republic of Germany (including West Berlin), Greece, Iceland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Turkey and the United Kingdom. Also, a validated license *is not* required for export of shotguns with barrel length 24 inches or over, and parts, n.e.s., to other destinations in Country Groups T and V, *except* the Republic of South Africa, Namibia, Botswana, Lesotho, and Swaziland, if for consignment or resale to other than police or law enforcement agencies.

Commodity Control List—399.1 Group 9 CCL-79

Export Control Commodity Number and Commodity Description	Unit	Validated License Required	GLV $ Value Limits T&V	Processing Code	Reason for Control
6998F [1,2] Shotgun shells, and parts.		SZ [1,2] and the Rep. of South Africa, Namibia, Botswana, Lesotho, and Swaziland	—	MG	3
4999B Horses for export by sea.		PQSTVWYZ and Canada	0	SS	2
5999B [4] Nonmilitary gas masks designed for protection against tear gas and other chemical agents; saps; straight jackets; bullet and blast resistant garments, helmets and shields; and parts and accessories, n.e.s.		PQSTVWYZ [3]	0	MG	5
6999G [1,2] Other commodities, n.e.s.; and parts and accessories, n.e.s.		SZ [1,2]	—	MG	3
7999I Prerecorded phonograph records reproducing in whole or in part, the content of printed books, pamphlets, and miscellaneous publications, including newspapers and periodicals; printed books, pamphlets, and miscellaneous publications, including bound newspapers and periodicals; children's picture and painting books; newspapers and periodicals, unbound, excluding waste; music books; sheet music; calendars and calendar blocks, paper; maps, hydrographical charts, atlases, gazeteers, globe covers, and globes (terrestrial or celestial) and advertising printed matter exclusively related thereto.		NONE	—	MG	—
9999M Technical models for demonstration.		The validated export license control applicable to each model is the same as the control which is applicable to the full size commodity represented by the model as exercised by Commerce (OEA and/or Maritime Administration), State (OMC), or Nuclear Regulatory Commission.			—

[1] A validated license also is required for export to the Republic of South Africa and Namibia if intended for delivery to or for use by or for military or police entities in these destinations or for use in servicing equipment owned, controlled, or used by or for these entities. See § 371.2(e)(11) and § 385.4(a).

[2] A validated license is also required for export or reexport to the U.S.S.R. if the exporter knows or has reason to know the commodity, except medicine and medical supplies, is for any use directly in preparation for, in conduct of, in support of, or visually identified with the 1980 Summer Olympic Games scheduled to commence in Moscow on July 19, 1980. These commodities are subject to controls under the authority of the foreign policy provisions contained in section 6 of the Export Administration Act of 1979. This commodity control list entry as well as the other entries in this Group are subject to controls on the basis of the above criteria.

[3] A validated license *is not* required for export of these commodities to Australia, Belgium, Denmark, France, the Federal Republic of Germany (including West Berlin), Greece, Iceland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Turkey and the United Kingdom.

Saving Clause

Shipments of commodities removed from general license as a result of changes set forth above which were on dock for lading, on lighter, laden aboard an exporting carrier, or in transit to a port of export pursuant to actual orders for export prior to 12:01 a.m. E.D.T., July 2, 1980 may be exported under the previous general license provisions up to and including July 9, 1980. Any such shipment not laden aboard the exporting carrier before 12:01 a.m. E.D.T., July 9, 1980 requires a validated license for export.

(Sections 4(e), 5, 6, 7, 13, 15, 17(d), 21, Pub. L. 96–72, 93 Stat. 503, to be codified at 50 U.S.C. App. 2401 *et seq.*; Section 309(c), Pub. L. 95–242, 92 Stat. 141, to be codified at 42 U.S.C. 2139a; Section 103, Pub. L. 94–163, 89 Stat. 877, 42 U.S.C. 6212; Section 101, Pub. L. 93–153, 87 Stat. 576, amending 30 U.S.C. 185; Section 201(10), Pub. L. 94–258, 90 Stat. 309, amending 10 U.S.C. 7430; Executive Order 12002 (42 FR 35623, July 7, 1977); Executive Order 12214 (45 FR 29783, May 6, 1980); Department Organization Order 10–3 (45 FR 6141, January 25, 1980); Department Organization Order 41–1 (45 FR 11862, February 22, 1980).)

Dated: June 18, 1980.

Eric L. Hirschhorn,

Deputy Assistant Secretary for Export Administration.

[FR Doc. 80–18859 Filed 6–24–80; 8:45 am]

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15 CFR Parts 371, 373, 375, 376, 378, 379, 385, and 399

Amendment to Export Administration Regulations to Conform to Revised Commodity Control List

AGENCY: Office of Export Administration, International Trade Administration, U.S. Department of Commerce.

ACTION: Interim rule with request for comments

SUMMARY: In a separate notice published today, the Office of Export Administration announced a major revision of the Commodity Control List (CCL) and the Advisory Notes for Selected CCL Entries. This rule amends the remainder of the Export Administration Regulations to correspond with the revised CCL format, commodity descriptions, and levels of control announced.

DATES: These revisions are effective June 25, 1980. Comments must be received by August 25, 1980.

ADDRESS: Written comments (six copies when possible) should be sent to: Richard J. Isadore, Acting Director, Operations Divisions, Office of Export Adminstration, U.S. Department of Commerce, Room 1617M, Washington, D.C. 20230.

FOR FURTHER INFORMATION: Archie Andrews. Director, Exporters' Service Staff, Office of Export Administration, U.S. Department of Commerce, Washington, D.C. 20230 (Telephone: (202) 377–5247 or 377–4811).

SUPPLEMENTARY INFORMATION: The Department of Commerce announced today major revisions to the Commodity Control List (CCL) and to the Advisory Notes for Selected CCL Entries, 15 CFR 399.1 and Supp. No. 1 to Part 385, respectively. This rule amends the remainder of the Export Administration Regulations insofar as they are affected by the revised CCL.

This rule:

a. Revises instructions concerning GLV $ Value Limits due to a change in the format of the CCL;

b. Revises instructions concerning the use of Commodity Group titles contained in the CCL on certain export control documents, due to the deletion of the sub-group titles;

c. Revises obsolete references to Export Control Commodity Numbers and commodity descriptions resulting from the renumbering and/or revision of entries in the CCL.

d. Clarifies types of transactions subject to special nuclear controls.

Since this rule and the rule announced today revising the Commodity Control List are complementary, interested persons are encouraged to submit comments on either or both of these rules in accordance with provisions of the invitation to comment contained in the rule announcing revisions to the CCL.

Accordingly, the Export Administration Regulations (15 CFR 368 *et seq.*) are amended as follows:

PART 371—GENERAL LICENSES

1. § 371.5(a) is revised to read as follows:

§ 371.5 General license GLV; shipments of limited value.

(a) *Scope.* A general license designated *GLV* is established, subject to the provisions of this § 371.5, authorizing the export in a single shipment of any commodity on the Commodity Control List as follows—

(1) To a destination in Country Group T or V provided that the net value of the commodity included in a single entry on the Commodity Control List (§ 399.1) does not exceed the amount specified in the column headed "GLV $ Value Limits T & V";[1]

(2) To a destination in Country Group Q, provided that the net value of the commodity included in a single entry on the Commodity Control list does not exceed the amount specified in a footnote as the GLV $ Value Limit for that Country Group;[2]

(3) From the U.S. Virgin Islands to the British Virgin Islands, provided that the net value of the shipment does not exceed $500 or the amount specified as the GLV dollar value limit for Country Group T, whichever is greater.

* * * * *

PART 373—SPECIAL LICENSING PROCEDURES

2. § 373.2(c)(2)(iv)(*b*) and (f)(1) are revised as follows:

§ 373.2 Project license.

* * * * *

(c) * * *

(2) * * *

(iv) * * *

(b) *Descriptive categories.* Use only the capitalized Group titles appearing in the Commodity Control List (§ 399.1) to describe the commodities, and break down the requirements for each commodity into sub-totals and grand totals for Country Group T, Country Group V, and another entry for all other Country Groups. (See example below.)

Example: Validated License Requirements for First Year

Commodity category	Country group T	Country group V	Other country [illegible]	Subtotal
Group 1—Chemical and petroleum equipment.....	$50,000	$100,000	$20,000	$170,000
Group 6—Metals, minerals and their manufacturers.....	130,000	180,000	25,000	335,000
Group 7—Chemicals, metalloids, petroleum products and related materials..	75,000	125,000	25,000	225,000
Grand totals.....	255,000	405,000	70,000	730,000

* * * * *

(f) * * *

(1) Shipper's Export Declaration. The Shipper's Export Declaration covering an export made under a Project License shall be prepared in accordance with

[1] Where a dash (—) appears in the column, the commodity may not be shipped to Country Group T or V under General License *GLV*. Another general license, however, may be applicable.

[2] If Country Group Q is listed in the "Validated License Required" column, but there is no footnote to indicate a GLV $ Value Limit, the value limit for Country Group Q is "0".

standard instructions. Although the Project License and amendments describe the commodities only by commodity groups, commodity descriptions on the Declaration shall show specifically the commodity description conforming to the applicable Commodity Control List description and incorporating any additional information where required by Schedule B; *e.g.*, type, size, name of specific commodity, etc. In addition, the Declaration shall include the Project License number, and one additional copy shall be prepared for each shipment. These copies shall be forwarded at the end of each month to the Office of Export Administration (Room 1617M), U.S. Department of Commerce, Washington, D.C. 20230.

* * * * *

3. § 373.3(d)(3)(ii)(*d*) is revised to read as follows:

§ 373.3 Distribution license.

* * * * *

(d) * * *
(3) * * *
(ii) * * *

(d) List separately on the application, or on an attachment thereto, all commodities identified by the code letter "A" following the Export Control Commodity Number on the Commodity Control List (§ 399.1) or, if feasible, describe them in related "A" product groups. Examples of acceptable "A" product groups are "Semi-conductors, A type," "Electronic test instruments, A type," etc. All other commodities within a single Commodity Group may be combined into a single entry. The commodity description for each entry shall be in terms of broad descriptive categories corresponding with the Group titles on the Commodity Control List.

* * * * *

4. § 373.7(d)(1)(iv)(*b*)(*5*) is revised to read as follows:

§ 373.7 Service Supply (SL) procedure.

* * * * *

(d) * * *
(1) * * *
(iv) * * *
(b) * * *

(5) All commodities not identified by the code letter "A" having Export Control Commodity Numbers with the same Processing Code may be combined into a single entry. The commodity description for each such entry shall be in terms of broad descriptive categories corresponding with the Commodity Groups that appear on the Commodity Control List (see § 399.1(j)).

* * * * *

5. Supplement No. 1 to Part 373 is revised to read as follows:

Special Licensing Procedures, Supplement No. 1 to Part 373, Commodities Excluded From Certain Special License Procedures, Export Control Commodity Number and Commodity Description

Commodity Control List (CCL) entries referred to in this supplement are excluded from certain special license procedures in their entirety, *unless* specific sub-entries (a, b, etc.) are annotated. Where specific sub-entries are given, only those sub-entries are excluded from these special license procedures.

2018 Specialized machinery, equipment, gear, and specially designed parts and accessories therefor, specially designed for the examination, manufacture, testing, and checking of the arms, ammunition, appliances, machines, and implements of war. (Entire entry.)

1075 Spin-forming and flow-forming machines, double support or three roller types, and specially designed parts and accessories therefor. (Entire entry.)

1091 Only those dimensional inspection machines that, according to the manufacturer's technical specifications, can be equipped with controls described on the Commodity Control List under entry No. 1091.

4094 Mandrels and bellows forming dies. (Entire entry.)

1110 Sub-entry (b) only: Gas liquefying equipment for the production of liquid fluorine and specially designed parts and accessories therefor.

1118 Equipment for the production of military explosives and solid propellants, and specially designed parts and accessories therefor. (Entire entry.)

2120 Cryogenic equipment: sub-entry (b)(3) only: Super-conducting electromagnets rated for producing peak magnetic inductions of 3 teslas (30 kilogauss) or greater at overall current densities of 10,000 amperes per square centimeter or greater and specialized components therefor.

4127 Pipe valves and parts, n.e.s. (Entire entry.)

1131 Pumps: sub-entry (a) only: Pumps designed to move molten metals by electromagnetic forces, and specially designed parts and accessories therefor.

3131 Valves 0.5 cm or greater in diameter, with bellows seal, wholly made of or lined with aluminum, nickel, or alloy containing 60 percent or more nickel, either manually or automatically operated; and specially designed parts and accessories therefor. (Entire entry.)

1205 [1] Sub-entry (a) (except for (a)(2)(iii)), and sub-entry (c): Electrochemical, semi-conductor, and radioactive devices for the direct conversion of chemical, solar, or nuclear energy to electrical energy, and specialized parts, components, and sub-assemblies of the above devices.

1206 [1] Electric arc devices for generating a flow of ionized gas in which the arc column is constructed; equipment incorporating such devices; and specially designed parts, accessories, and control or test equipment for such devices. (Entire entry.)

3261 Neutron generator system, including tubes, designed for operation without an external vacuum system, and utilizing electrostatic acceleration to induce a tritium-deuterium nuclear reaction, and specially designed parts for such devices. (Entire entry.)

4261 Particle accelerators, and specially designed parts and accessories therefor. (Entire entry.)

1312 Sub-entry (c) only: Isostatic presses, and control equipment, accessories, and parts which are specially designed for the above presses.

3336 Plants specially designed for the production of uranium hexafluoride (UF_6) and specially designed or prepared equipment, (including UF_6 purification equipment), and specially designed parts and accessories therefor. (Entire entry.)

1357 Filament winding, tape-laying and interlacing machines using materials described in entry No. 1763, and specialized parts, components, and accessories therefor. (Entire entry.)

1362 Vibration test equipment and specially designed ancillary equipment and software therefor. (Entire entry.)

3362[1] Power generating and/or propulsion equipment specially designed for use with military nuclear reactors. (Entire entry.)

3363[1] Electrolytic cells for the production of fluorine with a production capacity greater than 250 grams of fluorine per hour, and specially designed parts and accessories therefor. (Entire entry.)

4363[1] Nuclear reactor and nuclear power plant related equipment, and commodities, parts and accessories specially designed or prepared for use with nuclear plants. (Entire entry.)

2406 Vehicles specially designed for military purposes, and specially designed parts and components therefor. (Entire entry.)

1460, 5460, 6460 Sub-entries (a) and (b) only, 5460 entire entry, 6460 sub-entries (a) and (b) only: Nonmilitary aircraft and helicopters. (Nonmilitary aircraft designed to carry a minimum of 25 persons, including crerw, may be exported under the Distribution License to all normally eligible countries, except the Republic of South Africa, Namibia, Syria, Iraq, Libya, or the People's Democratic Republic of Yemen.)

5480 Nonmilitary mobile crime science laboratories; and parts and accessories, n.e.s. (Entire entry.)

1485 Sub-entries (f), (g), (h) and (i) only: Compasses, gyroscopes, accelerometers, and inertial equipment, specially designed parts and components and test, calibration, and alignment equipment for the above.

6490 Off-highway wheel tractors of carriage capacity 10 tons or more; and parts and accessories, n.e.s. (Entire entry.)

1502 Communications, detection, or tracking equipment of a kind using ultra-violet radiation, infrared radiation or ultrasonic waves, and specialized parts therefor. (Entire entry.)

1505 Television cameras incorporating electron tubes defined in entry No. 1555. (Entire entry.)

1516 Receivers, and specialized parts and accessories therefor. (Entire entry.)

4516 Communications countermeasures equipment (electronic, mechanical, optical, or other) capable of detecting, monitoring,

[1] Distribution license is available for shipments to countries listed in Supp. Nos. 2 and 3 to Part 373.

locating, or jamming surreptitious intercepting devices, and parts and accessories, n.e.s. (Entire entry.)

4517 Communications intercepting devices; and parts and accessories therefor. (Entire entry.)

1522 Only those lasers and laser systems and specially designed components and parts therefor, as follows: machine tools containing or which are designed to contain lasers described on the Commodity Control List under entry No. 1522; single aperture lasers with an output greater than on thousand joules per nanosecond; and tunable diode lasers.

4530 UF_6 mass spectrometers. (Entire entry.)

1534[1] Flatbed microdensitometers, and specially designed parts, components and assemblies therefor. (Entire entry.)

1542 Only those triggered spark-gaps having an anode delay time of 15 microseconds or less and rated for peak current of 3,000 amps or more; and specially designed parts therefor.

1553 Flash discharge type X-ray systems, including tubes, and specially designed parts and accessories therefor. (Entire entry.)

1555[1] Sub-entries (a) and (c) only: Electron tubes and specialized components and parts therefor. Image intensifiers, image converters, and camera tubes incorporating intensifiers and converters or coupled with such tubes; and specialized components and parts therefor.

1565[2 3] Electronic computers exceeding a CPU bus rate of 60 million bits per second or a processing data rate of 20 million bits per second.

1565[4 5] Other electronic computers, analog or digital (including digital differential analyzers).

4569 Inverters, converters, frequency changers, and generators having a multiphase electrical power output within the range of 600 to 2000 hertz. (Entire entry.)

1570[6] Thermoelectric materials and devices and specialized parts, components, and sub-assemblies therefor. (Entire entry.)

1585 Sub-entries (b), (c), (d), (e), (f) and (g) only: Photographic equipment, and specially designed parts and accessories therefor.

4585 Sub-entries (a) and (e) only: Photographic equipment, and parts and accessories, n.e.s.

4590 Multispectral image processing systems or digital image display enhancement equipment, and parts, components, and assemblies therefor. (Entire entry.)

4592[3] Equipment for measuring pressures to 100 Torr or less having corrosion-resistant sensing elements of nickel, nickel alloys, phosphor bronze, stainless steel or aluminum. (Entire entry.)

4597 Voice print identification and analysis equipment; and parts, n.e.s. (Entire entry.)

5597 Polygraphs; fingerprint equipment and analyzers; fingerprint and identification cameras and equipment; automated fingerprint and identification retrieval systems (whether or not computerized); psychological testing machines; infrared and ultraviolet films and plates and other photo anodized plates, sensitized and unexposed; and specially designed parts and accessories, n.e.s. (Entire entry.)

2603 Specifically designed components and parts for ammunition. (Entire entry.)

3604 Zirconium. (Entire entry.)

3605 Nickel. (Entire entry.)

3607 Lithium. (Entire entry.)

3608 Hafnium. (Entire entry.)

3609 Beryllium. (Entire entry.)

4635 Pressure tube, pipe, and fittings therefor. (Entire entry.)

1673 Artificial graphite having an apparent relative density of 1.90 or greater when compared with water at 60°F (15.50°C). (Entire entry.)

4675 Cylindrical tubing, raw, semifabricated, or finished forms, made of aluminum alloy (7000 series) or maraging steel or high-strength titanium alloys (e.g. Ti–6 Al–4 V, Etc.). (Entire entry.)

4676 Cylindrical rings, single convolution bellows, made of high-strength steels. (Entire entry.)

4677 Cylindrical discs, in raw, semifabricated, or finished form made of maraging steel or aluminum allow (7000 series). (Entire entry.)

4678[7] Corrosion-resistant sensing elements of nickel, nickel alloys, phosphor bronze, stainless steel, or aluminum specially designed for use with equipment which measures pressures to 100 Torr or less. (Entire entry.)

5680 Nonmilitary protective vests, helmets, leg irons, shackles, handcuffs, thumbcuffs, thumbscrews, and saps. (Entire entry.)

1701 Primary explosives or priming compositions. (Entire entry.)

4707 Chemicals: sub-entry (a) only.

2708 Explosives, propellants, and fuels. (Entire entry.)

3709 Beryllium oxide ceramic and refractory tubes, pipes, crucibles, and other shapes in semifabricated or fabricated form. (Entire entry.)

3711 Chlorine trifluoride. (Entire entry.)

1715 Boron: sub-entries (a), (b) and (c)(1) only.

4720 Radioisotopes, cyclotron-produced or naturally occurring and compounds and preparations thereof. (Entire entry.)

1746[8] Polymeric substances and manufactures thereof: sub-entry (d): only bullet and blast resistant vests, garments, and devices manufactured of aromatic polyamides.

1763 Fibrous and filamentary material which may be used in composite structures or laminates and manufactures thereof.

1781 Synthetic lubricating oils and greases which are or which contain, as their principal ingredient, monomeric and polymeric forms of perfluorotriazines, perfluoroaromatic ethers and esters, and perfluoroaliphiatic ethers and esters; or polyphenyl ethers and/or thio ethers containing more than three phenyl and/or alkyl phenyl groups. (Entire entry.)

4799 Chemical agents, including tear gas formulations containing 1 percent or less of orthochlorobenzalmalononitrile (CS), smoke bombs; and fingerprint powders, dyes, and inks. (Entire entry.)

1801 Synthetic rubber: sub-entry (c)(1) only: Carboxyl terminated polybutadiene, hydroxyl terminated polybutadiene, thiol terminated polybutadiene, and cyclized 1,2-polybutadiene.

5998 Nonmilitary shotguns, barrel length 18 inches or over; nonmilitary arms, discharge type; and parts, n.e.s. (Entire entry.)

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[2] Under the Distribution License procedure, electronic computers that do not exceed either a CPU bus rate of 500 million bits per second or a processing data rate of 225 million bits per second may be exported to approved consignees in destinations listed in Supplement No. 2 to Part 373. Electronic computers that do not exceed either a CPU bus rate of 200 million bits per second or a processing data rate of 60 million bits per second may be exported under the Distribution License procedure to approved consignees in destinations listed in Supplement No. 3 to Part 373. This exception also applies to any device, apparatus or accessory that upgrades a computer within the limits defined above.

[3] Distribution licenses are not valid for the export of any computers to ultimate consignees engaged directly or indirectly in any of the following activities—

(a) Designing, developing or fabricating nuclear weapons or nuclear explosive devices; or devising, carrying out, or evaluating nuclear weapons tests or nuclear explosions;

(b) Designing, assisting in the design of, constructing, fabricating or operating facilities for the chemical processing of irradiated special nuclear material, for the production of heavy water, for the separation of isotopes of any source or special nuclear material, or specially designed for the fabrication of nuclear reactor fuel containing plutonium;

(c) Designing, assisting in the design of, constructing, fabricating or furnishing equipment or components specially designed, modified or adapted for use in such facilities; or

(d) Training personnel in any of the above activities.

[4] Distribution licenses are not valid for the export of any computers to ultimate consignees engaged directly or indirectly in any of the following activities—

(a) Designing, developing or fabricating nuclear weapons or nuclear explosive devices; or devising, carrying out, or evaluating nuclear weapons tests or nuclear explosions;

(b) Designing, assisting in the design of, constructing, fabricating or operating facilities for the chemical processing of irradiated special nuclear material, for the production of heavy water, for the separation of isotopes of any source or special nuclear material, or specially designed for the fabrication of nuclear reactor fuel containing plutonium;

(c) Designing, assisting in the design of, constructing, fabricating or furnishing equipment or components specially designed, modified or adapted for use in such facilites; or

(d) Training personnel in any of the above activities.

[5] Excluded from Project License procedure. Any device, apparatus or accessory that upgrades a computer within the limits set forth in the first 1565 entry may be exported under the Distribution License procedure.

[6] Distribution license is available for shipments to countries listed in Supp. Nos. 2 and 3 to Part 373.

[7] Distribution license is available for shipments to countries listed in Supp. Nos. 2 and 3 to Part 373.

[8] Special licenses are available for shipment to Australia, Belgium, Canada, Denmark, France, the Federal Republic of Germany (including West Berlin), Greece, Iceland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Turkey, and the United Kingdom.

5999 Nonmilitary gas masks designed for protection against tear gas and other chemical agents; saps; straight jackets; bullet and blast resistant garments, helmets and shields; and parts and accessories, n.e.s. (Entire entry.)

PART 375—DOCUMENTATION REQUIREMENTS

6. The chart in § 375.1 is amended by revising Item 5 to read as follows:

§ 375.1 [Amended]

If the commodity is	And the country of destination is	Required document is	For specific regulations see
* * * * *			
5. Identified by the code letter A, B, C, D, E, F, G, or M.	All other destinations except those included in Country Group T.	Statement by Ultimate Consignee and Purchaser (Form ITA-629).	§ 375.2

7. The last sentence of § 375.2(e)(2) is revised to read as follows:

§ 375.2 Form ITA-629, Statement by Ultimate Consignee and Purchaser.

* * * * *

(e) * * *

(2) * * * Where Form ITA-629 is completed as a multiple transactions statement, the commodity description shall be stated in terms sufficiently definite to identify the commodities clearly, but broad enough to include all commodities to which the statement applies; *e.g.*, a commodity description set forth in a Group title of the Commodity Control List, such as "Metal-Working Machinery" usually would be a satisfactory description for any or all of the commodities included under that group.

* * * * *

PART 376—SPECIAL COMMODITY POLICIES AND PROVISIONS

8. Section 376.7 is revised to read as follows:

§ 376.7 Machinery, equipment, and parts.[1]

Export license applications for machinery, equipment, and parts for machinery and equipment shall include the following additional identifying information:

(a) A copy of the manufacturer's current catalog or bulletin, or pertinent pages describing the commodity, unless previously furnished.

(b) The maximum rating of commodities having a rated capacity.

(c) For exports of *ball or roller bearings* (ECCN 1371) to Country Group P, W, Y, or Z—

(1) The name of the manufacturer;

(2) The bearing number as listed in the manufacturer's catalog; and

(3) The inner bore diameter of the bearing.

(d) For exports of *balls for bearings* (ECCN 1371) to Country Group P, W, Y, or Z—

(1) The type of metal;

(2) The grade of the ball (in accordance with standards adopted by the Anti-Friction Bearing Manufacturer's Association); and

(3) The basic size of the ball.

9. Part 378 is revised as follows:

PART 378—SPECIAL NUCLEAR CONTROLS

Sec.

378.1 Purpose.
378.2 Nuclear related commodities and technical data (the nuclear referral list).
378.3 Additional validated license requirements for exports with certain nuclear end-uses.
378.4 Export licensing factors.
378.5 Maritime nuclear propulsion.
378.6 Advice of the manufacturer.
378.7 Preparing application.
378.8 Effect of other provisions.
Supplement No. 1—Procedures Established Pursuant to the Nuclear Non-Proliferation Act of 1978.
Supplement No. 2—Countries that are Party to the Nuclear Non-Proliferation Treaty and/or the Treaty for the Prohibition of Nuclear Weapons in Latin America (Treaty of Tlatelolco.)

(Sections 4, 5, 6, 13, 15, 17(d) and 21 Pub. L. 96-72 (50 U.S.C. App. 2401 *et seq.*); Section 309(c) Pub. L. 95-242 (42 U.S.C. 2139a); Executive Order 12214 (45 FR 29783, May 6, 1980); Departmental Organization Order 10-3 (45 FR 6141, January 25, 1980); International Trade Administration Organization and Function Order 41-1 (45 FR 11862, February 22, 1980))

§ 378. Purpose.

(a) *Scope.* This Part defines the types of export transactions that are governed by the U.S. policy concerning the non-proliferation of nuclear weapons or explosive devices, or the U.S. maritime nuclear propulsion policy. The controls implement the policies set out in sections 3(2) (A) and (B) of the Export Administration Act of 1979 (Pub. L. 96-72) and section 309(c) of the Nuclear Non-Proliferation Act of 1978 (Pub. L. 95-242), that is:

(1) To exercise the necessary vigilance from the standpoint of their significance to the national security of the United States;

(2) To further significantly the foreign policy of the United States or to fulfill its international responsibilities; and

(3) To maintian controls over items because of their potential significance for nuclear explosive purpose.

(b) *Related Legislation.* These controls supplement those exercised by the Nuclear Regulatory Commission and the Department of Energy under the Atomic Energy Act of 1954, as amended by the Nuclear Non-Proliferation Act of 1978 and other statutes, and by the Office of Munitions Control, Department of State, under the Arms Export Control Act of 1976. (See § 370.10.)

§ 378.2 Nuclear related commodities and technical data (the nuclear referral list).

(a) *Commodities Controlled for Nuclear Reasons.* Section 309(c) of the Nuclear Non-Proliferation Act of 1978 required the President to publish procedures regarding the control by the Department of Commerce over export items under its jurisdiction which could be, if used for purposes other than those for which the export is intended, of significance for nuclear explosive purposes. The commodities listed on the Commodity Control List (§ 399.1) that have the number 4 in the column titled "Reason for Control" have been identified as those that could be of signficance for nuclear explosive purposes, and hence are subject to validated licensing and the procedures established under this Part and under section 309(c) of the Nuclear Non-Proliferation Act of 1978. The procedures established pursuant to section 309(c), which originally appeared at 43 FR 25330 (June 9, 1978), are reprinted as Supplement No. 1 to this Part 378. Also, described in § 379.4(c), are certain related technical data that are subject to nuclear non-proliferation controls.

The Commodity Control List indicates the countries to which validated licenses are required. Some commodities are controlled for nuclear reasons to all Country Groups, and in certain instances to Canada. For other commodities, the nuclear controls apply only when a country is not listed in Supplements 2 and 3 of § 373.

(b) *Processing of Applications.* Applications for the export of these commodities and technical data will be processed in accordance with the interagency review procedures established pursuant to section 309(c) of the Nuclear Non-Proliferation Act reprinted as Supplement No. 1 to this Part, and the applicable provisions of these Regulations.

[1] Parts, accessories, and equipment that are to be scrapped are classified as scrap; *e.g.*, Commodity Group 6. See § 399.2, Interpretation 10.

§ 378.3 Additional validated license requirements for exports with certain nuclear end-uses.

In addition to the validated license requirements for commodities and technical data referred to in § 378.2 above, a validated license is required for export to all destinations, including Canada, of any other commodity or technical data where the exporter knows, or has reason to know, that the commodity or technical data will be used directly or indirectly in the following activities, whether or not the item is specifically designed or modified for such activities—

(a) Designing, developing, fabricating or testing nuclear weapons or nuclear explosive devices;[1, 2] or

(b) Designing, constructing, fabricating, or operating the following facilities, or components for such facilities [2]—

(1) Facilities for the chemical processing of irradiated special nuclear or source material;

(2) Facilities for the production of heavy water;

(3) Facilities for the separation of isotopes of source and special nuclear material; or

(4) Facilities for the fabrication of nuclear reactor fuel containing plutonium.

§ 378.4 Export licensing factors.

To fulfill the considerations set forth in § 378.1, the following factors are among those used to determine what action should be taken on individual applications subject to §§ 378.2 and 378.3:

(a) The stated end-use of the commodity or technical data;

(b) The significance for nuclear purposes of the particular commodity or technical data;

(c) The availability of the commodity or technical data from non-U.S. sources;

(d) The types of assurances or guarantees against use for nuclear explosive purposes or proliferation given in the particular case; and

(e) The non-proliferation credentials of the importing country concerned, based on consideration of factors such as:

(1) A country's status as a party to the Treaty on the Non-Proliferation of Nuclear Weapons or the Treaty for the Prohibition of Nuclear Weapons in Latin America (see Supplement No. 2);

(2) Whether the country has all its nuclear activities under International Atomic Energy Agency safeguards or equivalent full scope safeguards;

(3) Whether there is an agreement for cooperation in the civil uses of atomic energy between the U.S. and the country concerned;

(4) The country's public statements and policies concerning nuclear developments and non-proliferation;

(5) The extent of cooperation in non-proliferation policy generally (indications such as willingness to consult on international non-proliferation issues); and

(6) Intelligence data on a country's nuclear intentions and activities.

In view of the numerous considerations to be weighted in the case-by-case review process and changing circumstances, it is not feasible to specify countries' status for the purpose of implementing these controls.

§ 378.5 Maritime nuclear propulsion.

(a) *Policy.* It is the policy of the United States Government not to participate in and not to authorize United States firms or individuals to participate in foreign *naval* nuclear propulsion plant projects, except under an Agreement for Cooperation on naval nuclear propulsion executed in accordance with section 123(d) of the Atomic Energy Act of 1954. However, it is the policy of the United States Government to encourage United States firms and individuals to participate in *maritime (civil)* nuclear propulsion plant projects in friendly foreign countries provided that United States naval nuclear propulsion information is not disclosed.

(b) *Exports of Technology.* In view of the close relationship between maritime and naval nuclear propulsion technologies, it is necessary that the United States Government assure itself that United States naval technology will not be disclosed in connection with a foreign maritime nuclear propulsion project. Therefore, a validated export license or reexport authorization must be obtained from the Office of Export Administration before any disclosure of technical data in connection with a foreign maritime nuclear propulsion project. This technology includes any technical data relating to maritime nuclear propulsion plants, their land prototypes, and special facilities for their construction, support, or maintenance, including any machinery, devices, components, or equipment specifically developed or designed for use in such plants or facilities. Section 379.5(e) contains special provisions and instructions on filing applications for the export of such technology. This requirement applies to transactions, including assignment or exchange of personnel between U.S. firms and foreign firms, regardless of the legal relationship between the firms.

§ 378.6 Advice of the manufacturer.

(a) *Letter of Inquiry.* An exporter who knows the commodities he intends to ship are capable of the uses described in § 378.3, but is not the manufacturer of the commodities and is not sure whether a validated license is required, shall request a written statement from the manufacturer specifying whether under the provisions of § 378.3 the intended export would require a validated export license. In making such a request, the exporter shall fully state the purpose of the request. In all instances in which manufacturer believes a validated export license is required, the exporter shall apply for such license. However, notwithstanding the advice provided by the manufacturer, the exporter remains responsible for filing an export license application for any export subject to § 378.3. In the event that either the exporter or manufacturer has any doubt about the proposed export he may contact the Office of Export Administration or other appropriate government agency.

(b) *Records Retention.* The exporter shall retain a copy of his letter of inquiry and the manufacturer's reply and make them available for inspection, upon demand by the U.S. Department of Commerce, for two years in accordance with the recordkeeping requirements of § 387.11.

§ 378.7 Preparing application.

An application for a license to export commodities or technical data subject to the provisions of § 378.2, § 378.3 or § 378.5 shall be prepared and submitted on Form ITA–622P, Application for Export License, in accordance with instructions set forth in §§ 372.5 and 379.5(e) with the following additional instructions:

(a) *Identification of License Application.* Enter the words "NUCLEAR CONTROLS" across the top of the Form ITA–622P, immediately above the printed words "Application for Export License."

(b) *Ultimate Consignee.* If the ultimate consignee is not the end-user of the

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[1] Commodities and technical data specifically designed or specifically modified for use in designing, developing or fabricating nuclear weapons or nuclear explosive devices are subject to export licensing or other requirements of the Office of Munitions Control, U.S. Department of State, or the licensing or other restrictions specified in the Atomic Energy Act of 1954, as amended. Similarly, commodities and technical data specifically designed or specifically modified for use in devising, carrying out, or evaluating nuclear weapons tests or nuclear explosions (except such items as are in normal commercial use for other purposes) are subject to the same requirements.

[2] Also see § 379.5(e) for special provisions relating to technical data for maritime nuclear propulsion plants and other commodities.

commodities, give the name and address of the end-user in the "Commodity Description" space of the application or on an attachment thereto, and if known, the specific geographic locations of any installations, establishments, or sites at which the commodities will be used.

(c) *Supplier.* If the applicant is not also the manufacturer of the commodities and the application is being submitted under § 378.3, indicate on the application, in the space entitled "Commodity Description" or on an attachment, whether the advice of the manufacturer required in § 378.6 above has been received regarding the necessity for a validated license.

(d) *Commodity Description.* If the CCL entry in question is divided into sub-entries, indicate the specific sub-entry which describes the commodity. In addition, specifications or descriptive brochures should be provided when available. If applicable, include a description of any specific features of design or specific modifications which make the commodity capable of the uses described in § 378.3 above.

(e) *End-Use.* A vague or general end-use description will delay review of an application. Applications indicating resale as the end-use sometimes must be returned for more information. When submitting an application under § 378.3, fully explain the basis for the knowledge or belief that the commodities are intended for the purpose(s) described therein. Additionally, indicate, if possible, the specific end-use(s) the commodities will have in designing, developing, fabricating, or testing nuclear weapons or nuclear explosive devices or in designing, constructing, fabricating, or operating the facilities described in § 378.3.

§ 378.8 Effect of other provisions.

If, at the time of export, a validated license is also required under other provisions of the Export Administration Regulations, the application shall be submitted in accordance with the provisions of Part 378 as well as other applicable provisions. The requirements of Part 378 are applicable in addition to, rather than in lieu of, any other validated license requirement set forth in the Export Administration Regulations. Insofar as consistent with the provisions of Part 378, all of the other provisions of the Export Administration Regulations shall apply equally to applications for licenses and licenses issued under these special provisions.

Special Nuclear Controls, Supplement No. 1 to Part 378, Procedures Established Pursuant to the Nuclear Non-proliferation Act of 1978 [1]

Part F. Export Items Under Section 309c of the Act

Section 1. Procedures.

a. A list of commodities licensed by the Department of Commerce which, if used for purposes other than those for which the export is intended, could be of significance for nuclear explosive purposes, shall be developed and maintained by the Departments of Commerce and Energy in consultation with the Departments of State and Defense, the Arms Control and Disarmament Agency and the Nuclear Regulatory Commission.

b. Export license applications for commodities on the list referred to in paragraph 1, as well as any other applications which may involve possible nuclear uses, shall be reviewed by the Department of Commerce in consultation with the Department of Energy. When either the Department of Commerce or the Department of Energy believes that—because of the proposed destination of the export, its timing, or other relevant considerations—a particular application should be reviewed by other agencies, or denied, such application shall be referred to the Subgroup on Nuclear Export Coordination. The Subgroup shall promptly consider any such application and provide its advice and recommendations to the Department of Commerce. Disagreements shall be handled in accordance with the provisions of section 5 of Part A. [Section 5 indicates that, if interagency differences cannot be resolved, the issue may be referred to the NSC Ad Hoc Group on Non-Proliferation or, thereafter, the President. Notwithstanding interagency differences, the Department of Commerce has the authority to issue or deny licenses, provided it gives all other concerned agencies five working days notice.]

c. Reviewing agencies shall promptly, but not later than 30 days after receipt from the Department of Commerce of an application, provide their views thereon to the Department of Commerce. If, however, it is not possible to provide views within this time or if, at any point during review, it appears that final action on an application will not be completed within 60 days of receipt by the Department of Commerce, any agency which requires additional time shall inform the Department of Commerce at the earliest possible time of the issues involved and provide an estimate of the time needed to complete its review. The Department of Commerce will then advise the exporter in writing as required by section 4(g)(1) of the Export Administration Act of 1969, as amended.

d. If the Subgroup recommends denial of an application, the reasons therefor shall be articulated for the record. If the Department of Commerce agrees with the recommendation, that Department, in accordance with section 4(g)(2)(A) of the Export Administration Act of 1969, as amended, shall notify the applicant in writing of the negative considerations raised with respect to such license application. Before final action is taken on the application, the applicant shall be afforded the opportunity to respond within 15 days to such negative considerations. If appropriate, the applicant's response will be made available to the Subgroup for further review and advice. In the event of any disagreement which cannot be resolved between agencies, the provisions in section 5 of Part A shall be followed.

[1] Procedures were published at 43 FR 25330 (June 9, 1978).

Special Nuclear Controls, Supplement No. 2 to Part 378, Countries That Are Party to the Nuclear Nonproliferation Treaty and/or the Treaty for the Prohibition of Nuclear Weapons in Latin America (Treaty of Tlatelolco)*

Afghanistan
Australia
Austria
Bahamas*
Bangladesh
Barbados*
Belgium
Benin
Bolivia
Botswana
Bulgaria
Burundi
Cambodia
Cameroon
Canada
Cape Verde
Central Africa Republic
Chad
China (Taiwan)
Colombia*
Congo
Costa Rica
Cyprus
Czechoslovakia
Denmark
Dominician Republic*
Ecuador*
El Salvador
Ethiopia
Fiji
Finland
Gabon
Gambia, The
Germany, East (German Democratic Republic)
Germany, West (Federal Republic of Germany)
Ghana
Greece
Grenada*
Guatemala*
Guinea-Bissau
Haiti*
Honduras
Hungary
Iceland
Indonesia
Iran
Iraq
Ireland
Italy
Ivory Coast
Jamica*
Japan
Lesotho
Liberia
Libya
Liechtenstein
Luxembourg
Madagascar-Malagasy Republic
Malaysia
Maldives
Mali
Malta
Mauritius
Mexico*
Morocco
Nepal
Netherlands
New Zealand
Nicaragua*
Nigeria
Norway
Mongolian People's Republic
Panama*
Paraguay*
Peru*
Philippines
Poland
Portugal
Romania
Rwanda
Saint Lucia
San Marino
Senegal
Sierra Leone
Singapore
Somalia
Sri Lanka
Sudan
Suriname
Swaziland
Sweden
Switzerland
Syrian Arab Republic
Thailand
Togo
Tonga
Trinidad and Tobago*
Tunisia
Turkey
Tuvalu
Union of Soviet Socialist Republics
United Kingdom
United States
Upper Volta
Uruguay*
Vatican City
Vietnam, Republic of

*As of May 1, 1980. Those countries marked with an asterisk are also party of the Treaty of Tlatelolco and have waived this treaty's entry into force provisions. Colombia and Trinidad and Tobago are Non-Proliferation Treaty signatories.

Jordan	Venezuela
Kenya	Western Samoa
Korea, Republic of	Yogoslavia
Laos	Yemen, Peoples Democratic Republic of
Lebanon	Zaire

10. Section 379.4(c) (5), (7) and (8) are revised and paragraph (c)(9) is added, and (f)(1)(i), (o) through (q) are revised as follows:

§ 379.4 General license GTDR: technical data under restriction.

* * * * *

(c) * * *

(5) Plants specially designed for the production of uranium hexafluoride (UF_6), and specially designed or prepared equipment (including UF_6 purification equipment) and specially designed parts and accessories therefor;

(6) * * *

(7) Cylindrical tubing, raw, semifabricated, or finished forms, made of aluminum alloy (7000 series) maragine steel or high-strength titanium alloys (*e.g.*, Ti-6 Al-4 V, etc.) having the following characteristics:

(i) Wall thickness of ½ inch, or less;

(ii) Diameter of 3 inches or more;

(8) Cylindrical rings, or single convolution bellows, made of high-strength steels having all of the following characteristics:

(i) Tensile strength equal to or greater than 150,000 psi;

(ii) Wall thickness of 3 millimeters or less; and

(iii) Diameter of 3 inches or more.

(9) Pipes, valves, fittings, heat exchangers, or magnetic, electrostatic or other collectors made of graphite or stainless steel, or of other materials coated in graphite, yttrium or yttrium compounds resistant to the heat and corrosion of uranium vapor.

* * * * *

(f) * * *

(1) * * *

(i) * * *

(o) Single crystal sapphire substrates:

(p) Machinery, equipment, instruments and other commodities utilized for the exploration or production of petroleum or natural gas; and

(q) Terminal, multiplex or modem equipment designed for or used as components, accessories or sub-assemblies of frequency, time or space division telephone-switching systems employing digital transmission techniques designed at a data signaling rate of 2.1 megabits or less.

* * * * *

11. The first four sentences of § 385.1 are revised to read as follows:

§ 385.1 [Amended]

As authorized by section 6 of the Export Administration Act of 1979 and by the Trading With the Enemy Act of 1917 as amended by Public Law 95–223, a validated license is required for foreign policy purposes for the export and reexport of virtually all U.S.-origin commodities and technical data to destinations in Country Group Z. Certain exceptions are contained in Parts 371 and 379, and in ECCN's 7599, 7999, and 8999, on the Commodity Control List. Except as noted below, the general policy is to deny all applications or requests to export or reexport U.S.-origin commodities and technical data to these destinations. Exports on a non-commercial basis to meet emergency needs will be considered on a case-by-case basis. * * *

12. The Commodity Interpretations, incorporated by reference at 15 CFR 399.2, are amended as follows:

a. A new Interpretation 1 is added to read as follows:

Interpretation Electronic Computers and Related Equipment (ECCN 1565)

The following equipment is subject to nuclear non-proliferation controls and requires a validated license for Country Groups P, Q, S, T, V, W, Y and Z, and in the case of (a) (1) through (4) below to Canada:

(a) Electronic computers intended for ultimate consignees engaged directly or indirectly in any of the following activities:

(1) Designing, developing or fabricating nuclear weapons or nuclear explosive devices; or devising, carrying out, or evaluating nuclear weapons tests or nuclear explosions;

(2) Designing, assisting in the design of, constructing, fabricating or operating facilities for the chemical processing of irradiated special nuclear material, for the production of heavy water, for the separation of isotopes of any source or special nuclear material, or specially designed for the fabrication of nuclear reactor fuel containing plutonium;

(3) Designing, assisting in the design of, constructing, fabricating or furnishing equipment or components specially designed, modified or adapted for use in such facilities; or

(4) Training personnel in any of the above activities; and

(b) Advanced electronic digital computers with a bus rate of 60 million bits per second or more, or a processing data rate of 20 million bits per second or more (including digital differential analyzers), *except*

(1) *Electronic computers that do not exceed either a CPU bus rate of 500 million bits per second or a processing data rate of 225 million bits per second are not subject to nuclear non-proliferation controls for destinations listed in Supplement No. 2 to Part 373 of the Export Administration Regulations unless the activities cited in (a) above are involved; or*

(2) *Electronic computers that do not exceed either a CPU bus rate of 200 million bits per second or a processing data rate of 60 million bits per second are not subject to nuclear non-proliferation controls for destinations listed in Supplement Nos. 2 and 3 to Part 373 of the Export Administration Regulations unless the activities cited in (a) above are involved.*

b. The words "Export Control Commodity Nos. 1601 and 6699" appearing in paragraph (c) of Interpretation 2 are replaced with "ECN 1371 and 6699".

c. A note is added following (a)(6) of Interpretation 7 to read as follows:

Note.—When preparing an *export license application* for a numerical control system, the machine and the control unit are classified separately. If either the machine or the control unit requires a validated license, then the entire system requires a license. If either a machine or a control unit is exported separately from the system, it is classified on the export license application without regard to the other parts of a possible system.

When preparing the *Shipper's Export Declaration* (SED), however, a system being shipped complete (i.e., machine and control unit), should be reported under the Schedule B number for the machine. When either a control unit or a machine is shipped separately, it should be reported under the Schedule B number appropriate for the individual item being exported.

Interpretation 20 [Amended]

(d) Paragraph (b) of Interpretation 20 is modified by—

1. Deleting subparagraph (4)(i) and renumbering paragraphs 4 (ii) through (vi) to read (4) (i) through (v) respectively;

2. Adding a new subparagraph (5)(iv) to read: "Pulse modulated radio altimeters,";

3. Renumbering paragraphs (5)(iv) through (5)(vi) to read (5)(v) through (5)(vii) respectively; and

4. Adding a new paragraph (6)(iii) to read: (iii) Incorporating any digital signal processing technique used for automatic target tracking, or having a facility for electronic tracking.

* * * * *

(Sections 4, 5, 6, 13, 15, 17(d) and 21 Pub. L. 96–72 (50 U.S.C. App. 2401 *et seq.*); Section 309(c) Pub. L. 95–242 (42 U.S.C. 2139a); Executive Order 12214 (45 FR 29783, May 6, 1980); Departmental Organization Order 10–3 (45 FR 6141, January 25, 1980); International Trade Administration Organization and

Function Order 41–1 (45 FR 11862, February 22, 1980))

Dated: June 18, 1980.

Eric L. Hirschhorn,

Deputy Assistant Secretary for Export Administration.

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